The Iron Age

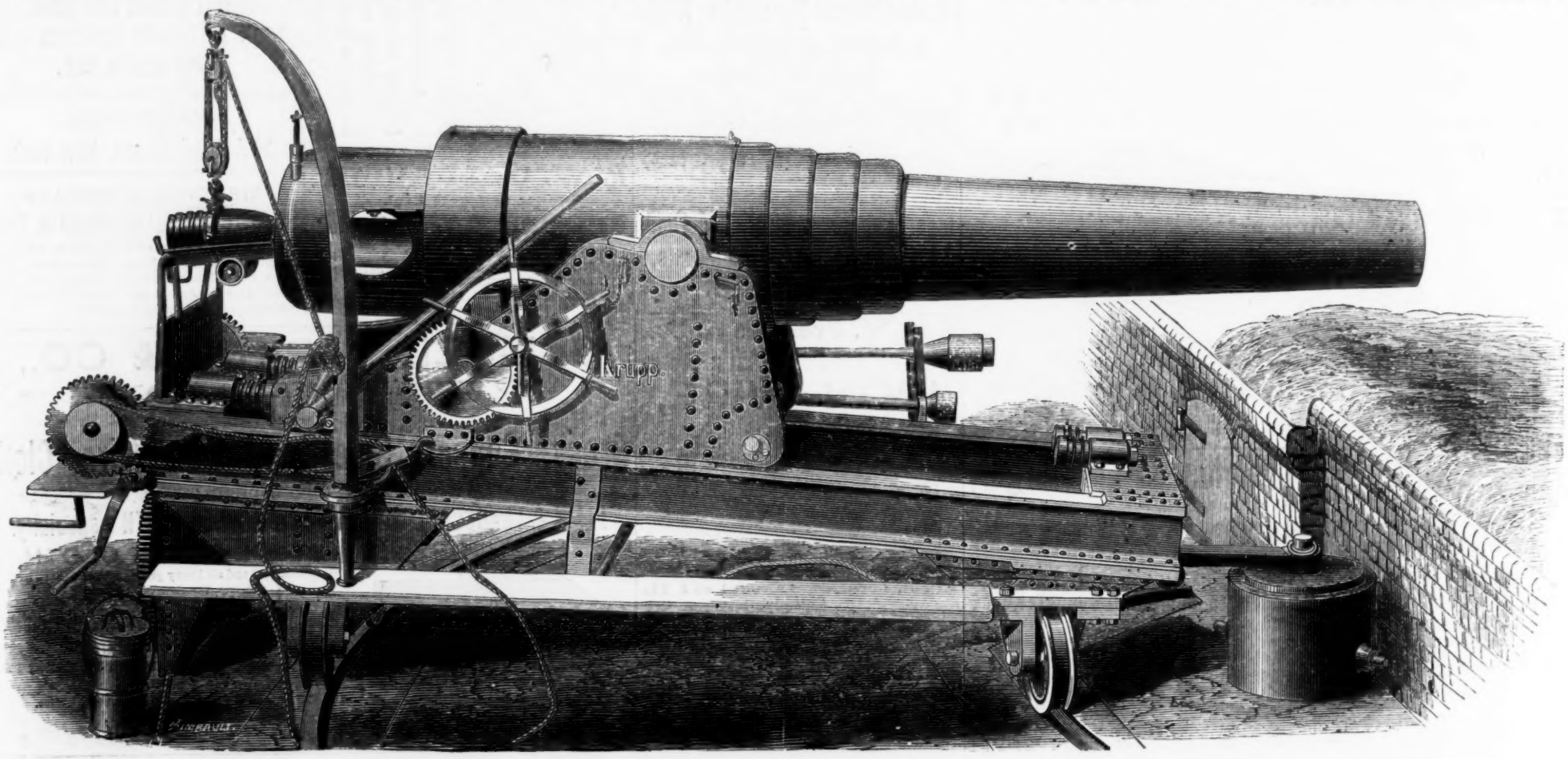
A Review of the Hardware and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 10 Warren Street, New York.

Vol. XIV: No. 8. *New York, Thursday, August 20, 1874.* *Four Dollars a Year. Single Copies, Ten Cents.*

Cast Steel Artillery.

The accompanying illustration represents a 10-inch 22-ton cast steel gun, manufactured by Krupp, the celebrated founder of Essen, Prussia, and now in use in the German artillery service for coast defense. The arm is made of two layers of rings or hoops over the barrel, and fires a shell of 423 pounds, with a charge of 66 pounds of powder, at 1200 yards, through an 8 inch armor plate. The illustration shows the gun mounted in a sea fort, and resting on a thick bed of concrete so as to fire over an earth breastwork 40 feet thick, the muzzle of the piece being 7 feet above the platform. A tramway, not shown in the engraving, runs behind the guns upon the terreplain, upon which trucks loaded with projectiles, after being hoisted up from the casemate below the gun platforms by means of a hydraulic lift, carry the required ammunition to the battery. The trucks are so high that the projectiles can be rolled from them direct upon the platform, where two davits with tackles receive them and lift them up to the breech. In the engraving a shell is



THE KRUPP 10-INCH CANNON.

shown just entering. The arrangements are said to be so perfect that six men are sufficient to work a 10-inch gun, firing once every 1¼ minutes, or about 40 rounds per hour.

The Ferryhill Ironworks.

The works of the Rosedale and Ferryhill Iron Company are in some respects the most remarkable of their kind in the world. Situated about two miles from the village of Ferryhill, on the direct line from London to Newcastle, the tops of furnaces can be distinguished by the traveler looming above and beyond the mountains of scoriæ which separate them from the railway. But it would never occur to a casual passer by that the Ferryhill Works were anything out of the common, and comparatively few are acquainted with their singular history and peculiar characteristics. As these characteristics are of considerable importance, from an engineering point of view, we propose to describe them at some length.

It is now fourteen years since the first blast furnaces were built at Ferryhill. They were two in number, and their hight was only 48 ft. Since then, however, they have been relined, and raised to an altitude of 78 ft. The next four furnaces, built in 1866, were carried to a hight of 80 ft., with 21 ft. diameter of bosh. These furnaces have been blowing continuously since their erection, and they do not yet show any signs of requiring relining or repair. In 1868 other two furnaces were built, and as the proprietor had found important advantages to accrue from the increased altitude of the later furnaces, he resolved on carrying these new furnaces to the hight of 103 ft., with 27 ft. 6 in. diameter of bosh. This experiment was bold and hazardous, and there were those who predicted that it would end in failure. But the very opposite result has followed. The consumption of coke in the 48 ft. furnaces was over 30 cwt. to the ton of pig; in the 80 ft. furnaces it was reduced to 20 cwt., but in the 103 ft. furnaces it was found practicable to reduce the consumption of coke to 17½ cwt. per ton of pig iron made. This was the lowest consumption ever attained in a blast furnace, and it still remains unique. The output of the larger furnaces was proportionately more than that of the smaller ones. In the 48 ft., or original furnaces, the weekly production did not exceed 200 to 250 tons; in the 80 ft. furnaces it was increased to 350 tons, but in the 103 ft. furnaces the unparalleled production of 600 to 700 tons per week was obtained under ordinarily favorable conditions.

Influenced by the remarkable success of their high furnaces, the Rosedale and Ferryhill Iron Company are now completing other two new furnaces, which have been carried to the hight of 105 ft. from the hearth. The working portion of each of these furnaces is 100 ft. 6 in. high, and the diameter of the bosh is 33 ft., being the largest diameter of any furnace yet constructed. The capacity of each furnace will be between 55,000 and 60,000 cubic feet. Both furnaces are built at an angle of 45 deg., the lining is 3 ft. thick all the way up, and the exterior iron casing, which is ⅝ in. thick at the bottom, is reduced to ½ in. thick toward the top. To prevent the hanging of the furnaces, they are built with two angles, one outward and the other inward. The hight of the bosh is 38 ft., and the foundation is 12 ft. deep, there being 6 ft. of solid concrete and 6 ft. of hearth. The diameter of the bell used for charging the furnace is 11 ft., that of the main pipe for carrying off the gases being 8 ft., while the down-comer is only 7 ft. A splendid brick hoist is built between the two furnaces, and will take up four barrows at a time, each barrow holding 14 cwt. of stone and 5 cwt. of coke. Each furnace is supplied with five tuyeres, which will blow 4½ lb. pressure of blast. The tuyeres are furnished with wrought iron muzzles, in order that the pressure of blast may be either increased or diminished. Practical men will understand that when it is proposed to work the furnaces on forge pig the muzzles should be enlarged, whereas for gray iron they should be diminished.

The heating stoves of the new furnaces will present some novel features. It is intended to work at a temperature of 1100°, but it will be possible with these stoves to raise the temperature to 1500°; but as they have not yet been patented by Mr. Thomas, the practical manager of the Ferryhill Works, who is responsible for their design, it would be unfair to him to describe them more particularly than to say that they are constructed very much on the principle of the tubular boiler, with flat pipes, there being eighteen pipes in each stove, and four stoves to each furnace. Both round pipe and flat pipe stoves are used in connection with the other furnaces, but the flat pipes are preferred because they allow the air to come more into contact with the metal. Each of the new furnaces is supported on twelve wrought iron standards 36 in. diameter at the bottom and 24 in. at the top. The new hoist will be driven by a vertical engine of 16 in. cylinder and 2 ft. stroke. Some years ago hydraulic hoists were more in favor than any other used in the Cleveland districts, and there is no doubt that special advantages belong to the use of Sir William Armstrong's accumulator, the water balance hoist, which is also common in the North, and the hydro-pneumatic hoist, in which compressed air is the medium accumulated. But a reaction has recently set in against the more expensive and complex hoists, and the direct acting steam ram lift, or the ordinary winding engine, with drum and wire rope and reversing motion, are being generally adopted for the more recently erected furnaces. Brick hoists are also taking the place of iron ones. For this there are two reasons—one being that men object to iron hoists as dangerous in boisterous weather, and the other being the greater cheapness of bricks compared with the present cost of iron. At the Ferryhill Works there are now in operation one of Sir William Armstrong's hydraulic hoists, two direct acting steam hoists, and one water balance hoist, but the two latter are preferred over the former on account of their greater simplicity in working, to say nothing of the great difference as regards first cost.

Much difference of opinion prevails among practical men as to the limit of hight that can most advantageously be adopted in a blast furnace, and there are some whose predilections and experience may induce the belief that it is impossible to secure the best results in a furnace carried to the extreme hight of 105 ft. But a very little practice is in this matter worth a great deal of theory, and the proprietors of the Ferryhill Works have demonstrated to their own satisfaction that a furnace of the extreme hight of 105 ft., and the unparalleled capacity of 55,000 cubic feet, is more economical than one of smaller dimensions. Neither their views nor their experience appear, however, to be largely shared by others. It is pretty well known that the large furnace erected at the Ormesby Works, by Mr. Charles Cochrane, has proved a failure, and its failure is attributed to its exceptional capacity, which is not more than 41,000 cubic feet, or 15,000 cubic feet less than the capacity of the Ferryhill furnaces. The probability is, indeed, that the failure of the Ormesby furnace was not due so much to its extremely large size as to some defect in its construction. A great deal depends upon the arrangement of the angles of a furnace. If it is too straight, scaffolding is almost sure to take place; but if there is a sufficient angle to allow of the proper fall of the material inside, there need be little danger of hanging. This, at any rate, is the conviction of the manager of the Ferryhill Works, and his long and varied experience and recognized ability entitle him to speak with some authority. Assuming, then, that it is possible, without danger of scaffolding or hanging, to carry the blast furnaces of Cleveland to an altitude of 105 ft., it becomes important to consider whether, in other respects, that hight, or a still greater altitude, can be adopted with safety and advantage. The chief advantage claimed for the high furnaces of Cleveland is the saving of coke; but iron masters have also found that in their high furnaces the quality of the iron has been improved—it has been more highly carbonized and rendered more uniformly soft throughout than formerly. It remains to be seen whether these benefits are obtained to a correspondingly large extent in furnaces of still greater size, and to this question the blast furnace engineer of the future will require to give due consideration. We shall take leave of this aspect of our subject with the remark that Mr. Morrison and his partners have in this, as in many other matters, exhibited a rare amount of enterprise and penetration, entitling them to the thankful recognition of the trade; for although their great experiment has proved a success, and thus tended to their own gain as well as to the benefit of the trade as a whole, it might have involved them in irretrievable loss.

The engines employed at Ferryhill Works are of a size and power commensurate with the greatness of the furnaces. There are four engines blowing at the present time, but two others have been built for the new furnaces. For the two highest furnaces now in blast there is a beam engine with a 67 in. steam cylinder, a 130 in. blowing cylinder, and 10½ ft. stroke. This engine was made in 1868 at the Lilleshall Works. The first engine erected at these works was made by Messrs. Aitken & Mansell, of Glasgow. It is a single engine, having a steam cylinder of 36 in., a blowing cylinder of 70 in., and a stroke of 8 ft. The valves are worked by four bevel wheels and cams, and the engine does 14 strokes per minute day and night. Another pair of blowing engines—also made at Lilleshall—have steam cylinders 52 in., blowing cylinders 108 in. diameter, and a stroke of 9 ft. These engines are coupled together, but they can be disconnected and worked singly. It is one excellent feature of these works that all the engines are so connected that if anything should compel one of them to be laid off, the furnaces which it blows could be worked by some of the other engines at a lower pressure. The new engines will not be fully at work until the new furnaces are blown in, but they are of a kind well known in Cleveland as Slade's patent. They are distinguished by this peculiarity, that the blowing cylinder is placed above the steam cylinder, and the piston rod goes up through both. They blow a great deal of blast on account of their exceptionally high speed, and although their first cost is much less than that of an ordinary beam engine, they are worked at so high a pressure that they cannot last nearly so long; so that it is doubtful whether, in the long run, their use leads to any economy. Messrs. Cochrane, Groves & Co., of Middlesbrough, are the makers of these engines. The steam cylinder is 48 in.; the blowing cylinder, 100; and the stroke, 4 ft.

The Ferryhill Works possess all the advantages necessary to the carrying on of a large and prosperous business. The company own very large ironstone royalties at Rosedale, on the sea coast, near to Whitby. This stone contains 40 per cent. of iron, so that only 2½ tons of it are necessary to produce a ton of pig. The company also own the Coxhoe and Thristlington collieries, from whence they raise all the coal, and at which they manufacture all the coke required at Ferryhill. Limestone is brought to the works from the company's quarries at Raseby Hill, near to the blast furnaces. The present production of crude iron is about 3500 tons per week; but when the two new furnaces, now almost completed, are put in blast—which will happen early next year—the weekly production of pig iron will be raised to 5000 tons, or a larger production than that of any other single establishment in the North of England. All qualities of iron are produced, from the highly carbonized gray iron to white forge iron. The metal is run off three times in the twenty-four hours at the two large furnaces, and twice in the twenty-four hours from the others. The blast is not stopped for more than ten minutes during the time of casting.

Space will not permit us to enter more minutely into the mechanical arrangements of the Ferryhill Works, but we cannot refrain from adding that in these and in all other respects they are worthy of their founder, attest the energy and administrative capacity of the general manager, Mr. Smith, and reflect credit on the engineering skill of the practical manager, Mr. Thomas.—*Engineer.*

Birmingham until now has engrossed the doubtful honor of supplying, with impartial generosity, missionaries and bibles to the more inquiring among the heathen, idols to those who prefer to walk in the old ways. But from a paragraph in a Sheffield paper we learn that the sharp blades of Hallamshire have likewise been in the habit of thus making the best of both worlds. It appears that the Japanese, finding that the old forms, at least, of heathenism do not fit well with the new civilization they are so eagerly adopting, are getting rid of their old gods. The Chinese have been called the English of the East; we may look upon the Japanese as a sort of Oriental Scotch; they are not throwing away their idols, but selling the These are chiefly of metal, and of the precious metals in many cases, and the Mikado is making almost as good a thing out of his reformation as Henry the VIII did of his. It is in this way that we ascertain the birthplace of at least one of these discarded representatives of the gods of Japan, which is advertised for sale in the following terms: "For sale, at Kama-Kura, a very fine idol with six arms. It is 15 feet high, and was cast in bronze, at Sheffield."

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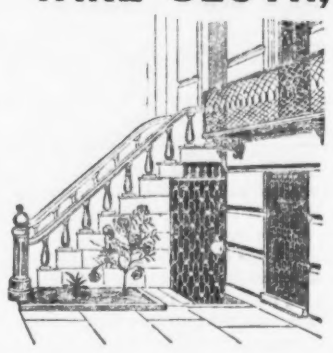

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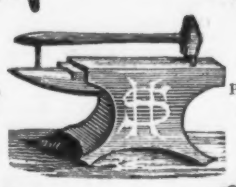

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Mark. PATENTED Feb. 17, 1874.

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This Welding Compound is of indispensable utility in all establishments where iron and steel are forged, whether on a large or small scale. It perfectly unites iron to iron, iron to steel, steel to steel, wrought iron or steel to cast iron, and iron or steel to Bessemer metal, without requiring the parts to be welded to be brought above a cherry red heat, and effecting a great saving in fuel over all other welding compounds or fluxes which require the metals to be brought to a white heat.

This compound is manufactured under the inventor's personal supervision, and is sold and warranted genuine under the above trade mark, in 5, 10, 50 and 100 lb. packages. Price for 5 and 10 lb. packages, 30 cents per lb.; for 50 and 100 lb. packages, 25 cents per lb. Samples sent on order.

The advertiser respectfully refers to the following establishments in which his welding compound is exclusively used: TERWILLIGER & Co., Safe Makers, New York; TRENTON VISE & TOOL WORKS, Trenton, N. J.; BENJ. ATHA & Co., Newark Steel Works, Newark, N. J.; WASHOE TOOL MFG. Co., Elm Park, Staten Island; CYRUS CURRIER & Co., Engine Builders, Newark, N. J.; JERSEY CITY STEEL WORKS, J. R. Thompson & Co., Jersey City, N. J.; GRANT LOCOMOTIVE WORKS, Paterson, N. J.; DELAMATER IRON WORKS, N. Y.; DELAWARE AND LACKAWANNA RAILROAD Co.

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Gouges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly, generally same day as received.

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Steel & Iron Drop Forgings.

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"SCANDINAVIAN SECURITY PAD LOCKS."

The best and handsomest locks in the market. The Case and Cap are made of malleable iron, and the shackle case hardened. Prices lower than on any other lock *with shoulder on shackle upon the market.*

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FINE BASS AND TROUT FLY RODS.

The celebrated **Greenheart Wood** a specialty.

FINE ROD MOUNTINGS.

Full line of Tackle for Brook, River and Sea Fishing. Agents for **Jno. James & Sons'** celebrated **Fish Hooks and Needles.** Illustrated Catalogues mailed to the trade on application.

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THE

Rocky Mountain Vermilion Paint

is "Nature's Compound" of Copper, Mercury, Lead and Iron. A pure Oxide of Metals, containing no earthy matter, hence we claim and are prepared to *prove* that it is the Best and Cheapest Paint in the market. Properly mixed, we will guarantee it to cover double the surface and wear twice as long as ordinary paints. It will not Peel, Scale, Crack or Blister, though subjected to high degrees of heat. It will effectually Prevent the Corrosion of Metals, even in mid ocean. Warranted superior to red lead or any other lead, for any and all purposes for which paint is required. Please send for circulars.

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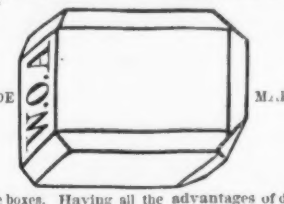
Formerly known as the J. T. & Co. brand, and the only true California Borax now made, will hereafter bear this



upon the boxes. Having all the advantages of dryness claimed for any other product from the Pacific coast, the form of the crystals, denoting purity, is the same as the best English.

It received the first premium from the American Institute, 1873. Consumers can rely upon the strength and purity of this brand.

Delivered in New York, Boston or Hartford.

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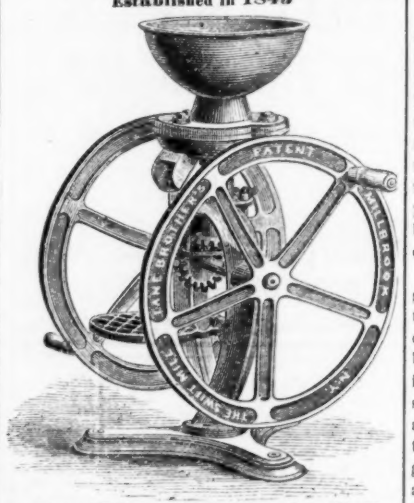
Established in 1845



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Stands nearly 2¼ feet high. Is highly finished, color deep Vermilion and Gold. We make more than 20 different styles and sizes.

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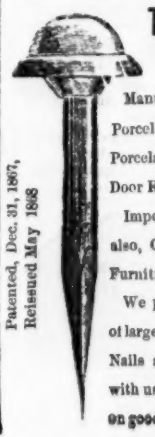
Pat. Oct. 4th, 1870; Nov. 7th, 1871; March 12th, 872. Re-Issued Oct. 29th, 1872.

Office and Salesroom, No. 254 Pearl St., New York Factory, Nos. 252, 254 & 256 Pearl Street.



Patented, Dec. 31, 1867, Reissued May 1868

T. C. RICHARDS & CO.,

47 Murray Street, N. Y.,

Manufacturers of Richards' Patent Porcelain-head Picture Nails; also, Porcelain Picture, Drawer, Shutter, and Door Knobs, etc., etc.

Importers of German Brass Goods, also, China, Gilt, Steel, and Silvere Furniture Nails Wire Nails etc., etc.

We particularly invite the attention of large buyers to our Patent Picture Nails and Knobs being a specialty with us, we offer satisfactory discounts on good orders

The Absurdity of Reciprocity.

The Philadelphia *Age* discusses the question of reciprocity from a somewhat novel standpoint, as follows:

During the last session of Congress a project, which bore strong intrinsic evidence of having been engendered in England, whose manufacturers long to again possess control of American markets, was presented to our government in favor of reciprocal free trade with the Dominion of Canada. Some trickery having come to light with regard to the manner in which the project was sought to be promoted, the Senate threw it aside in disgust, and it failed to be adopted.

Meanwhile, fearing, perhaps, that the project may be brought forward again next winter, the Canadian manufacturers have held a convention, which is still in session at Hamilton, at which an almost unanimous opposition to the proposed treaty was developed, on the ground that it would merely serve as a cover for the stocking of the American and Canadian markets with British (not Canadian) manufactures, and in this way would lead to the ruin of Canadian industrial interests.

No unbiased mind can doubt that this would certainly be one of the effects of the proposed treaty. Not only do the terms of the treaty render this species of fraud easy to commit, but it is quite safe to say that no reciprocity treaty can be framed, no matter in what terms, under which such frauds could not be committed with entire impunity. And the temptation is too strong to suppose for a moment that they would not be committed. They were largely committed under the old reciprocity treaty, when the sum of our taxes, Federal and local (and consequently to a material extent, the level of prices), was measured by $150,000,000 of annual imposts; and it follows, as a matter of course, that they would be committed, and even more largely, now that the sum of our yearly taxes is upward of $1,000,000,000, and the level of prices throughout the country commensurately enhanced.

Setting aside the very important question as to whether under the "most favored nation" clauses of our treaties with foreign powers, reciprocity with any one of them were practicable without reciprocity with all; setting aside the real or fancied aspects of reciprocity in the light of the free trade or protection theories; and setting aside its probable bearing one way or another, on particular industries, there is a point of view from which this project has to be considered that is of infinitely more importance than any other. As might be expected in this era of marked superficiality of thought, this is precisely the point of view from which the subject has yet not been considered at all. The point of view alluded to is that of the national level of prices.

It requires but the most cursory view of the statistics of prices in various countries to determine the fact that in most countries an entirely different level exists. The difference here alluded to is not that which relates to particular commodities, for this difference in prices may proceed from natural peculiarities of climate, location, &c.; but is that which relates to all commodities and not wholesale but retail prices, for it is these that shoulder the main burdens of taxations—in short, it is the difference in the cost of living.

Even when measured by the same medium, gold, this difference in the various countries of the world, and often in contiguous ones, is very considerable; and it arises not only, as assumed by a certain class of theorists, from differences in the cost of production, from freightage and shipping charges and from customs taxes, but also from many other sources which such theorists never consider. A difference in the general level of prices between one country and another may arise from the freedom and effectiveness of labor; from internal taxation; from the relative plentifulness of capitalized or uncapitalized wealth; from the condition of the currency and the extension of credit and therefore from national honesty, sanguineness of temperament, etc.; from the rate of interest for money, and therefore from the administration of justice, for this affects the security of loans, and also from the national rate of mortality, for this affects the net rate at which the increase of capital and therefore of interest, progresses; in short from a great many circumstances which it would be tedious to recount and in which it is pretty safe to say no two nations agree.

The result of these differences is a varied level of prices all over the world—a level which for many generations yet, must remain, as it is, and has always been, highest in the United States, and lowest in China. Under no conceivable circumstances, except an entire substitution of races and epochs, could the respective levels of prices in these two countries become reversed or even equalized. And although the difference between the level in this country and England is much less than that between it and China, yet it is enough, under all circumstances which are susceptible of being changed by legislation, for example, tariff laws, to render abortive all attempts to equalize them.

The effects of such efforts always have been, and always must be, pernicious. Such effects resemble those which follow the thawing of glaciers, the freshet of rivers, the breaking down of Alpine lakes. The moment it is untrammeled water will seek a common level; so with prices. But the track of both, under such conditions, is commonly the track of ruin and desolation. Just as trammels are necessary in the wise ordering of the world's fluvial systems, so are they necessary in the wise ordering of human affairs. Nor is it artificial trammels that are alluded to, but natural ones; such as have been recounted above.

It is not because this conclusion involves the retention of our present tariff laws that it is insisted upon as a guide to what should be our policy with reference to the proposed reciprocity treaty; it is because it is a correct one. It is equally as applicable to a proposition that involves the general raising of the tariff, as to one that involves its general lowering. Indeed it has nothing especially to do with the tariff. It is an argument against any proposition to alter, by means of legislation, the level prices in a country.

It is based on the fact that the level of prices is due to circumstances over which legislation can have but little influence, circumstances connected in a thousand recondite ways with our entire system and phase of civilization, and which, therefore, it would be very unwise to tinker with by means of a reciprocity treaty or any other invention of fools. It is a necessity which arises out of the nature of things that each country must pursue its own system of legislation, and strictly in the line of its own advantage, and it is in vain that this necessity would be effaced by sinister design or its instrument, a shallow and false commercial policy. The very existence of commerce depends upon the diversity of national conditions, and, though such attempts must ever prove impracticable, every attempt to artificially level these conditions is a step toward the extinction of commerce and the inauguration of non-intercourse and national isolation in its stead.

Consumption of Coal in Iron Manufacture.

The *Railroad and Mining Register*, of Philadelphia, publishes the following estimates of the amount of coal annually consumed in iron manufacture in the United States:

We find that the United States produced in 1873

2,290,658 tons of pig iron, exclusive charcoal pig.
721,775 tons iron rails.
980,000 tons rolled iron of other kinds.
128,266 tons Bessemer steel rails.
40,000 tons cast steel.

We find also that the total production of anthracite and Bituminous coal amounted in

1873 to.....26,567,492 tons anthracite.
1873 to.....25,295,448 tons Bituminous.

Total.....50,862,940 tons.

For cast steel we estimate only the coal required to convert from bar iron.

The tons used are all those of 2000 pounds.

The amount of cast steel for 1873 is stated on the authority of the manufacturers before Congress. The amount of coal is taken from *Miners' Journal Register*. For the other figures we are indebted to report of the American Iron and Steel Association. Now, having these figures we are enabled to work backward, by knowing the ratio of coal used to the ton of iron of different kinds, and to the ton of steel. We make the following estimates, based on experience and careful calculation to cover waste, loss on coal in coking, &c.:

One ton pig iron requires	2·25 tons coal.
One ton rolled iron, other than rails	2·40 "
One ton iron rails, including steel-headed rails	2· "
One ton Bessemer rails	1·80 "
One ton cast steel	5· "

These figures are considered slightly low, certainly fairly representing the average work of the whole country. They refer, of course, to the finished merchantable product in each case. Multiplying one set of figures by the other, we have:

	Tons.
Tons pig iron	2,290,658x2·25=5,153,980
Tons iron rails	721,775x2· =1,443,550
Tons rolled iron	980,000x2·4 =2,352,000
Tons of Bessemer rails	128,266x1·80= 230,878
Tons of cast steel	40,000x5· =2,000,000
Total tons coal	9,380,408

Taking these totals we find that the manufacture of iron in the United States required no less than 18½ per cent. of the coal mined in the country. This is merely for the production of the metal, not including the transportation of the 18½ per cent. of the entire coal, nor the power used in mining it.

Our estimate includes iron, excepting rails, only as a raw material for a second series of industries. The pig iron goes into castings say to one-third the amount produced, and the plate and bar iron goes into a vast variety of products. The foundries, forges, mills and mechanical and locomotive shops, form a most extensive series of industries, perhaps rivaling the original in importance. But they all depend on the original production of iron, as given above, and this industry alone uses nearly one-fifth of the entire coal mined in the country.

We cannot compare our estimate with the English figures, as they include all the other industries mentioned, while we are unable to make an estimate of them. If, however, England mined last year 130,000,000 tons of coal and used 39,000,000 for all her iron and steel works, we make a good showing with over 9¼ million tons used solely to produce the iron itself.

When we consider the facts involved here, we see how vast an industry this represents. Coal forms but a small part of its needs; its demand for iron ore peoples portions of our country; and its need of limestone, fire brick, machinery and manufactured products of all kinds, gives rise to an enormous interchange of products. Very few have any idea of the transportation required to effect this exchange. It is easy to see why such an industry should be protected. We can judge of its value to England by the sacrifices she makes and the efforts she puts forth to break up our trade and retain the markets of the world. It is worth as much to us as it is to her, and it is incumbent on us to use every means in our power to supply our own wants and transfer hither as much of her trade as we can.

The Illinois Zinc Co., of Peru, is employing a force of 60 men, and is turning out three tons per day. The zinc comes from Mineral Point, Wis., and the Galena district, and is taken there to be manufactured because coal is cheap and good.

Iron.

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IRON WAREHOUSE,
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Importers and Dealers in
IRON AND STEEL,
COMMON AND REFINED BAR IRON,
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PIG IRON,
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Iron of all sizes and shapes made to order.

Manchester Steel Works,
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Best Tool & Machinery Cast Steels
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206 & 208 Franklin St., N. Y.,
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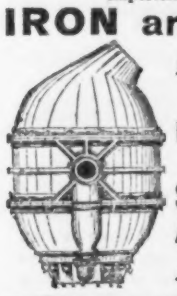
IRON and STEEL.

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MACHINERY STEEL,
Cast Steel and
SPRING STEEL,
ANGLE and T IRON.
Special Irons for Bridge and Architectural Work.

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Successors to JOHN R. ABEEL & CO.,
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A full assortment of all sizes constantly on hand.
English and American Refined Iron of choicest brands.
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Used in the Construction of
Fire-Proof Buildings, Bridges, &c.
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A. R. Whitney & Bro.'s Rivets.
Whitney's Best Bar Iron.
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Books containing Cuts of all Iron now made, and Sample Pieces at office. Please address 58 Hudson Street.

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Agents for the sale of
Fall River Iron Co.'s Nails, Bands, Hoops & Rods,
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Borden Mining Company's Cumberland Coals.

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25 & 27 Cliff St., New York.
Bar Iron, Sheet Iron, &c
Of every description

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MANUFACTURER OF
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In Ports of New York & New Orleans.
Steel Rails of most approved Makers.
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S. WHITNUM,
Manufacturer and Galvanizer of
Coal Rods, Water Pails, Baking Pans, &c.
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Dealer in
Anthracite & Charcoal Pig Irons,
OLD SCRAP and CUT NAILS.
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BIRMINGHAM, CONN.
ESTABLISHED 1836.
Rolling Mills complete for the manufacture of
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India Rubber and Paper Calenders, Grinding and Cutting Machines, Gearing, Shafting, &c, most approved patterns.

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CUT NAILS,
HOT PRESSED NUTS,
Machine Forged Bolts,
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BARS suitable for Steel of all grades, Wire, Shovels, Hoes, Scythes, Carriage Bolts, Nail Rods, Tacks, &c.
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PATENT CORRUGATED FIRE-PROOF SHUTTERS, of Superior Quality.
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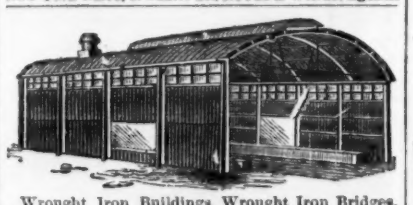

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Also, New and Second-Hand Anchors, Chains and Machinery of all descriptions.
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The highest price paid for Wrought and Cast Scrap Iron. Storage for Pig, Bar and Railroad Iron taken at the lowest rates.
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2½	"	115·00	" "
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10	"	110·00	" "

Net cash currency, or 30 days' draft. Cartage, $1 per ton, delivery in Boston. Address
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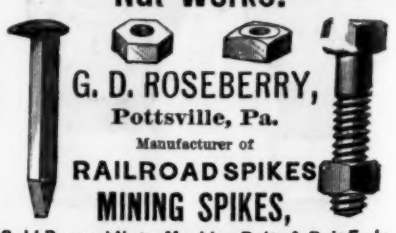
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New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN PUDDLING FURNACES.

Specification forming part of Letters Patent No. 153,110, dated July 14, 1874, issued to Joseph L. Pennock, of Coatesville, Pa.

The object of this invention is to maintain the integrity of puddling furnaces for a longer time than usual, and to economize the consumption of the iron or "fix" which is usually employed as a lining for puddling furnaces; and these objects are attained by means of cast iron chills, through which steam is caused to circulate, with or without air, in the manner described hereafter.

Figure 1 of the accompanying drawing represents a vertical section of the bed of a puddling furnace, and Fig. 2 a sectional plan on

Fig. 1.

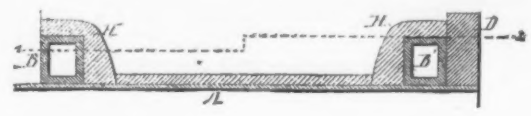
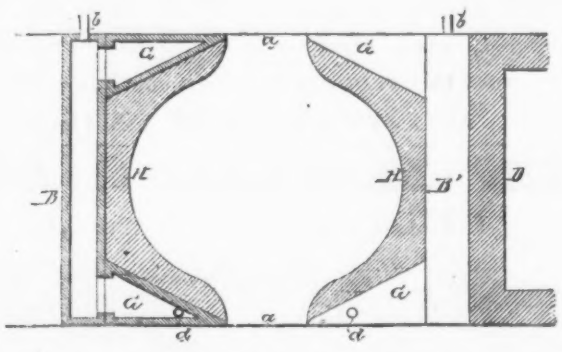


Fig. 2.



IMPROVEMENT IN PUDDLING FURNACES.

the line 1 2, Fig. 1. A is a cast iron plate, which, as usual, supports the bed of the furnace, and B and B' are two hollow cast iron chills, extending entirely across the bed, as shown in Fig. 2, the chill B' being situated directly behind the bridge wall D. At opposite sides of the furnace are the usual doorways *a a*, toward which are directed the tapering ends of the hollow cast iron cheeks G, the latter, although cast separately from the chills, communicating freely therewith, as shown in Fig. 2. Steam pipes *b* communicate with the chills, so that live steam may at all times pervade the interior of both chills and cheeks, there being an outlet at *d* for the escape of the steam.

There may be, in the end of each chill, an opening larger than the pipe *b*, which projects into the said chill, so that air may enter with the steam.

H represents the refractory iron ore, technically termed the fix, which is banked up against and over the top of each chill, as shown in Fig. 1.

Chills through which water is caused to circulate have frequently been used in connection with puddling furnaces, but they are very apt to break, and, in some cases, to explode, and endanger the lives of the attendants. Owing to this, their frequent removal is demanded, and this cannot be accomplished without disturbing the integrity of the furnace.

Chills never crack under the influence of steam, and the refractory ore or fix H will last much longer when banked against the steam chills. Practical tests have proved that the steam chills effect a saving of this iron or fix to the extent, at the lowest estimate, of two hundred pounds to the ton of iron manufactured.

Claim.—The mode described of maintaining the chills of furnaces at the required temperature—that is, by means of currents of steam, or steam and air combined, passed through the chills.

IMPROVEMENT IN THE MANUFACTURE OF IRON AND STEEL.

Specification forming part of Letters Patent No. 152,942, dated July 14, 1874, issued to Charles J. Eames, of New York.

The nature of this invention consists in constructing an ordinary open or sinking furnace for the production of charcoal iron by substituting for the ordinary tuyere of such furnace a petroleum or other hydrocarbon vapor burner, and also in using this structure to carry out a process for producing a substitute for charcoal iron by means of petroleum or other hydrocarbon vapor instead of charcoal; and also of preparing a bottom of quartz and sand, or charcoal dust.

In the drawings, Figure 1 is a vertical section, and Figs. 2 and 3 are enlarged detail views of the same.

A is the ordinary open or sinking furnace; D, the pipe supplying air from any suitable blower, and has a cock, *I*, with which to regulate the supply and power of the air blast. C is my burner, which is shown in a somewhat different form in my previous patent. This burner is formed of three tubes concentrically placed, so that between the outside one, C', and the one next to it, marked F, there is an annular chamber open at both ends, and a like, but smaller, chambers between this tube F and the inner and smallest tube G; but this chamber is closed at one end, and is connected with a pipe, E, at one side, and the smallest tube G is open at both ends. The inclosing tube C' is at one end—just at the ends of the inner tubes nearest the furnace—made to taper for about six inches, or to the end projecting into the furnace, and changed from a cylindrical to a semi-cylindrical form to resemble the blast end of the ordinary tuyere.

The burner C is connected with the air supply pipe D, as illustrated in Fig. 1. The burner C is, by pipe D, supplied by a current of air that passes (when cock I is opened) between pipes C' and F, and through tube G, around the gas chamber between tubes F and G, the current of air commingling with the gas that is supplied from pipe E, which communicates with a generator of petroleum or hydrocarbon vapor or gas—this vapor or gas readily flowing from pipe E when cock J is turned into tube F, and thence into the tuyere like end *d* of tube C', where it commingles and begins to burn, upon the principle and with the fierce and efficient heat of the Argand burner.

In the ordinary process of manufacturing charcoal iron there is formed a bottom of lump charcoal on the hearth B; then a layer of scrap iron, or iron ore combined with a flux, is laid over the bottom; then alternate layers of the metal, or ore and flux, until the furnace is filled. The blast of air is then turned on through the tuyere into the previously ignited charcoal bottom; and from thence the heat passes upward, igniting successively each of the supposed layers of charcoal, causing the metal, or ore and flux, as the case may be, to sink or fuse toward the hearth. This mass as it settles down upon the hearth has added to it additional layers of the materials in alternate layers as when the mass was first arranged; and when the whole mass that has settled down on the hearth has formed a loop of suitable size and weight to be worked as a bloom the process is ended.

From the use of such an immense quantity of charcoal the iron made by this process is very expensive, and the process described in this patent process will substitute the less expensive petrolem vapor or gas for the charcoal, and thus reduce the cost of this metal. The charcoal dust bottom is made by packing the dust on the hearth B several inches deep at the sides and corners, and hollowed out in the center in hemispherical shape, or somewhat shallower at the center of such hollow, the charcoal-dust to be about two inches deep—this hollow to receive the mass as it settles down from the effect of the heat; the quartz and sand bottom is made by placing enough on the hearth B so that when this sand and quartz bottom has been fused, which is done previous to beginning to work the furnace, it shall be about two inches deep. The bottom having been prepared, the scrap iron, or iron ore and flux, as the case may be, is then piled up on the hearth B until the furnace is filled. The cocks I and J are then turned so as to permit a moderate blast to pass through the burner, and at this moment the vapor blast is ignited when the charcoal dust bottom is used. The ignited vapor blast impinges upon the center of the hearth, and passes on up through the mass to be reduced to a loop. A moderate blast is continued until the whole mass has been homogeneously heated. When the mass has been heated by the moderate blast to the proper degree, the full blast is then turned on so as to supply sufficient vapor to rapidly reduce the mass without burning or wasting the metal. The mass is then added to with fresh materials until enough has been added to form a loop, which, when reduced to the proper form, is taken out and hammered into a bloom; or when it is desired to convert the loop into steel, the whole mass, when it has been reduced to the size of a loop, is covered with charcoal dust to a depth of about four or five inches. The air cock I is partially closed, so as to diminish the supply of air, and cock J is turned on so as to furnish a copious supply of petroleum vapor to form a rich carbon flame; the loop then being carefully turned from time to time so as to receive the direct action of the flame on all its parts—always keeping it covered with charcoal dust—until the process is completed, the time of its completion depending upon the size and weight of the loop and the quality of steel required.

It is sufficiently obvious that such a great increase in the amount of the charcoal dust and richness of the hydrocarbon flame makes it possible for the iron loop to rapidly absorb and assimilate the necessary elements of carbon to convert the loop into steel. It is advisable, in order to attain a high grade of steel, to combine during the formation of the loop with the mass of scrap iron, or iron ore and flux, various proportions of spiegeleisen and oxide of manganese. A working proportion in about ten per cent. of spiegeleisen and four per cent. of the oxide of manganese to the mass of scrap iron.

Any excessive accumulation of cinder, or oxide of iron, or other impurities, is drawn off in liquid state through the apertures provided for that purpose in the ordinary open furnace, from time to time, and only sufficient cinder is permitted to come in contact with the loop during its formation as is desirable. The cinder that falls from the bloom while being hammered may be put into the furnace, and economize any iron therein, and also aiding and furthering the process as in the old or ordinary process.

Claim.—1. The process of producing a substitute for charcoal iron by using petroleum or other hydrocarbon vapor in an open or sinking furnace.

2. The combination of burner C, pipes D and E, with cocks I and J, furnace A B, and quartz and sand or charcoal dust bottom.

Fig1.

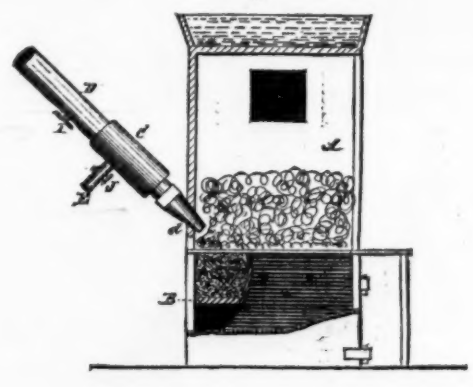


Fig2.

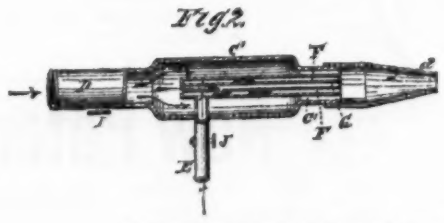


Fig3.

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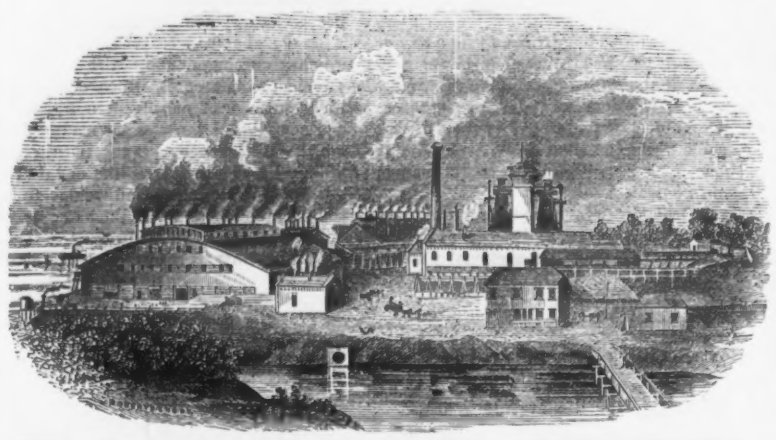

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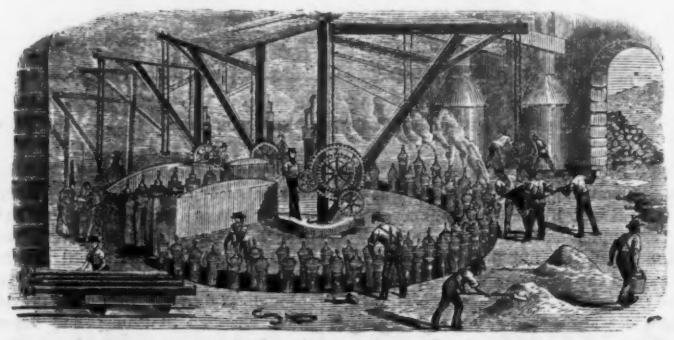

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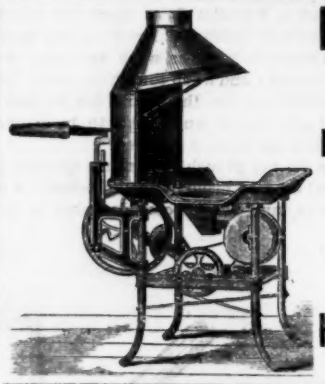

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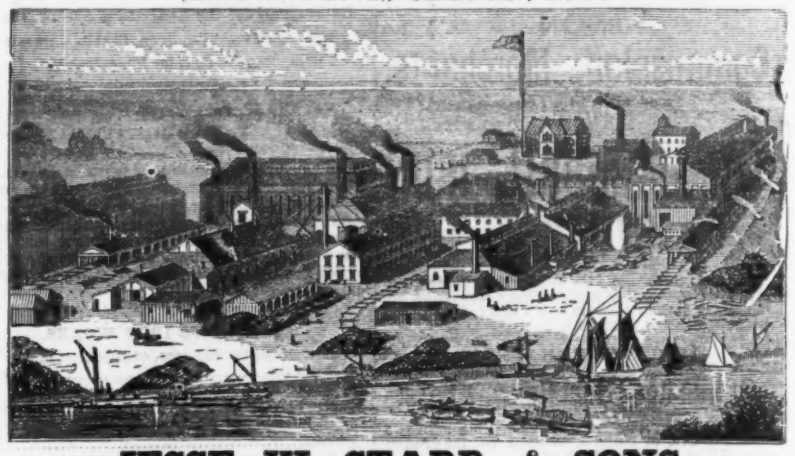

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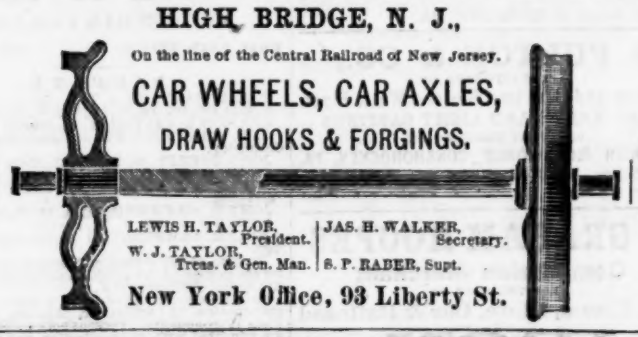

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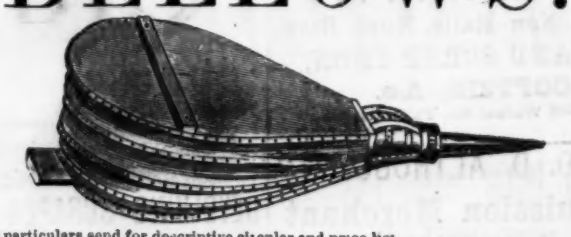

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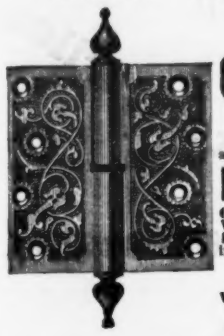

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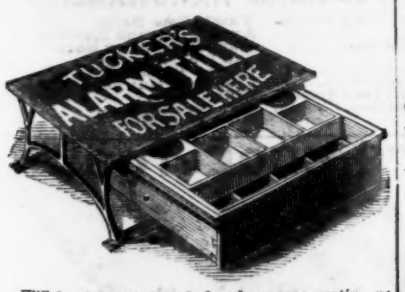

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Price List with description sent on application.

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Recent Progress in Science.

Prof. Joseph Lovering, of Cambridge, Mass., in retiring from the presidency of the American Science Association, gave an interesting resume of recent progress in science, which will interest many of our readers:

Not even the capacious mind of a Goethe, a Humboldt, a Whewell, or a Herbert Spencer, is large enough to give shelter to all the subjects which will come before this association. I sympathize with the remarks of President Hunt, at Indianapolis, in which he questioned the propriety of excluding geology from the ranks of the physical sciences. I would give them a still wider significance. I can picture to myself all these subjects handled in the same masterly grasp of mechanics and mathematics by which the physical astronomer holds in his hands the history and destiny of the solar system. "Why," asked Cuvier, "may not natural history some day have its Newton, to whom the laws of circulation of the sap and the blood will only be as the laws of Kepler?" I may quote the words of a distinguished mathematician: "An intelligence which at any given instant should know all the forces by which nature is urged, and the respective situations of the beings of which nature is composed, if, moreover, it were sufficiently comprehensive to subject these data to calculation, would include in the same formula the movements of the largest bodies of the universe, and those of the slightest atom. Nothing would be uncertain to such an intelligence, and the future no less than the past would be present to its eyes." Helmholtz has established by his own example the possibility of being an eminent physiologist, and at the same time standing in the front rank of physicists and mathematicians. The restlessness of human inquiry will never be satisfied with knowing what things are, until it is also discovered how and why they are, and all the relations of space, time, matter, and force, in all the kingdoms of nature, are worked out with mathematical precision.

THE FIELD TO BE REVIEWED.

This vast mechanical problem fortunately was not all presented at once. That of the solar system was worked out slowly. That of the binary stars followed after a long interval. As yet in the problems presented by clusters of stars the observer is wholly at sea without chart or compass, and with no illumination save that which comes from a prophecy in Newton's Principia. How trifling is the region which has been brought under the rigid rules of the astronomer compared with that outside; how feeble his progress compared with that of the worker in natural history!

Whewell presents each science as circling around the master mind which figures in each successive epoch of its history. Comte passes each science through a theological and metaphysical crisis. Buckle brings forward science in equal steps with civilization. Each of these methods has its advantage, but none will exactly answer the present purpose. Let us for this occasion ask whether, in the advancing columns of the physical sciences, there are any improvements in the weapons of attack, or have any additions been made to them. They are of two kinds—instruments for experiment, and the logic of mathematics. Between the days of Galileo and of Davy we recognize as the chief instrumentalities by which physical science has been prompted, the telescope, the microscope, the pendulum, the balance, and the voltaic battery. None of these is superannuated. The little spyglass of Galileo has expanded into the magnificent refractors of Cambridge, Chicago and Washington. The little reflector with which Newton hoped to supplant the lens has grown into the colossal telescopes of Lord Rosse, Herschel and Lassell. With all my admiration for the wonderful powers of the microscope, the telescope, and the voltaic battery, I must pause to eulogize that simplest of scientific tools, the pendulum. It has no rival as a standard of length except the meter. It furnishes an exact measure of time, an essential factor in the study of all motion, and the most available means of obtaining longitude in the earth and right ascension in the heavens. By it the shape, rotation, and density of the earth, and many of the laws of gravity, have been determined; and it has done for electricity and magnetism much that it effected for gravity. The experiment with the pendulum at Paris demonstrated to the public eye the earth's rotation. The new contrivance of Zollner promises to indicate changes in the direction of force as accurately as the common pendulum measures intensity.

THE VELOCITY OF ELECTRICITY.

Among recent additions to instrumental means is one that has taken place during the current year. In 1826 Poggendorf described his device for observing with extreme nicety the movements of a magnetized bar. Gauss embodied this idea in his magnetometer. Lissejous devised the method for compounding the vibrations of tuning forks and tracing in golden lines the curves of musical vibration. Koenig has translated time into space and made visible the vibrations of the viewless air. Wheatstone, by a revolving mirror, determined the velocity of electricity, the duration of electrical discharges, and the duality in the direction of the transmitted disturbance. Feddersen, and more recently our own associate, Rood, repeated his experiments. Indirectly the velocity of electricity thus ascertained (and the greatest known except that of gravitation), has been tested by signals through long lines of land and ocean telegraph, giving a lower figure than that of Wheatstone. But the anomaly is due to a misinterpretation. That electricity moves through a quarter of a mile of wire at the rate of 288,000 miles in a second is not evidence that it would move over 288,000 miles in one second. Electricity has no velocity in the ordinary sense. The transmission of the electrical disturbance is proportional to the square of the distance to be traveled; therefore the velocity varies with the length of the journey. This law, deduced from the mathematical theory of Ohm, introduces order among experiments where hitherto there has been confusion. The slender volume which perpetuates his name was first published at Berlin in 1827, and antedates Wheatstone's experiments by seven years. Had the results of Ohm been sooner heeded science would have long ago been materially advanced. Arago, making use of Wheatstone's method, proved experimentally that the velocity of light was greater in air than in water, giving a fatal blow to the corpuscular theory of light and establishing the undulatory theory. The mean of the two values obtained for the velocity of light in the experiments of Fizeau and Foucault, comes very close to the astronomical estimate. Cornu has recently repeated Fizeau's experiment, eliminated its errors and brought it into accord with Foucault.

THE DISTANCE OF THE SUN.

Let us see what these experiments have determined for astronomy. The sequences in the eclipses of Jupiter's moons are modified by the velocity of light. The aberration of starlight is a measure of the ratio between the velocity of light and that of the earth. For nearly two centuries our knowledge of the velocity of light leaned upon one or the other of these relations. Foucault's experiments intensified the doubt astronomers had long entertained as to the correctness of the received distance of the sun. The "black drop" in the transit of Venus has been found the basis of uncertainty. Mr. Stone, an astronomer, has examined this source of error, and by calculations that give due weight to this source of discrepancy, has suddenly brought about a reconciliation between the experiments of Cornu and Foucault, the motions of the moon and the transit of Venus, which is as perfect as it is surprising. Nevertheless the observations of the coming transit will be welcomed as a further means of confirming these results, and photography will add its valuable aid. Even geology will be the gainer by this certainty of measurement, which will throw another limit around the vast epochs which mark the progress of our earth from its cradle to its grave in our central luminary.

Merely mentioning the efficient assistance which the polariscope, the stereoscope and the instruments of photography have conferred, the speaker hurried on to the consideration of the spectroscope, the invention of which was reviewed in detail, historically, and some account of its services to science was compressed in a few brilliant paragraphs of a general character.

In reviewing the advances of natural history, Prof. Lovering spoke of the discoveries in that science made by Maupertuis and Lamarck, and considered them in connection with the nebular hypothesis as originated by Laplace and carried forward by the elder Herschel. The fate of the nebular hypothesis is yet uncertain, but spectroscopic discoveries have lent it a new lease of life. Enough of earth has been detected in the stars to make a man feel at home anywhere in the visible universe, and the nebular hypothesis will at least answer the purposes of science till a better theory is brought forward.

The motion of the fixed stars involves a most interesting inquiry. Is there some central point of space, some center of gravity of the material universe, around which there is equilibrium, while everywhere else there is motion? The delicacy of the problem of sidereal movements is greatly enhanced by the extreme distances of the stars. A motion has, however, been observed, absolute in the case of the sun, and capable of estimate in the different stars as fast as their distances are determined. Here again spectroscopy has come to our aid. The alteration of wave lengths of light by the motion of the observer or the object observed, has helped, and is helping, to solve this problem. This discovery was then historically reviewed, going back to the discovery of the velocity of light by observations on Jupiter's satellites, and coming down to the calculations of Vogel and Huggins on the displacement of star spectra. These latest observations are to be received as somewhat doubtful approximations. There is, too, the possibility that the misplacing of the lines of sodium, hydrogen, and other elements may be due to different conditions from any we know on earth in the gaseous atmospheres of the stars.

MATHEMATICS AND PHILOSOPHY OF SCIENCE.

The mathematical and philosophical state of the sciences may now claim our attention. The undulatory theory of light gives rise to a new series of problems. How is the ether affected by the gross matter which it invests and permeates? Does it move when these bodies move? If not, is the motion of the waves changed thereby, altering the wave length or the time of oscillation? Astronomy says that aberration cannot be explained unless the ether is at rest. Optics replies that refraction cannot be explained unless the ether moves. Arago has discussed and Fresnel has offered an explanation of the discrepancy. Very recently, Ketteler, of Bonn, has gone over the whole ground with great care. The observations of Huggins on star drift open a new series of questions, and may possibly throw discredit upon the accepted estimates of star distances, made independently by Struve and Argelander. Van der Willigen, in the present year, has published a well considered memoir on the fallacies which he regards as vitiating the conclusions of Huggins. Except under certain improbable conditions, he shows that the motion of the luminary will not interfere with the time of oscillation. If this be accepted, the supposed motion of the stars must receive another interpretation. On the other hand, if the motion of a luminary is ascertained, and it is found to accord with spectrum displacement, the mathematical theory will have to be reconsidered. Secchi's observations on displacements in the lines on the sun's equator are rendered indeterminate by more recent investigations, in which Vogel has participated.

THEORIES OF GRAVITATION.

The philosophical position of the theory of gravitation was traced downward from the time of Newton. Prof. Lovering thinks that the turning point between old theories of physics and new was reached in 1837, when Faraday published his experiments on the specific inductivity of substances, and the discovery of diamagnetism aided the progress. "Faraday," says Maxwell, "saw in his mind's eye lines of force traversing all space where previously mathematicians saw centers of force attracting at a distance. Faraday saw a medium where they saw nothing but distance. Faraday sought the seat of the phenomena in real actions going on in the medium; they were satisfied that they had found it in a power of action impressed on the electric fluids." Sir William Thomson, Prof. Maxwell, Gauss, Weber, Helmoltz labored at the mathematical laws involved. Maxwell and Thomson are profuse in their acknowledgments to Faraday. A revision of the theory of gravitation was the natural outgrowth. In 1873 Sir William Thomson resuscitated and republished the theory of Le Sage, posthumously printed in 1818, and fitted it out in a fashionable dress. It accounts for gravity by the collisions of atoms with atoms, while bodies which look toward each other are screened on opposing faces from the encircling bombardment.

In 1870 Prof. Guthrie gave an account of the attraction of a light body by the vibration of a tuning-fork. Thomson, repeating the experiment, attracted a suspended egg shell by a wave of the hand. The experiments were considered as throwing new light on the doctrine of attraction. Prof. Challis, in an elaborate work, has discussed the interplay between ether and atoms, and the theory may now be regarded no longer as a speculation, but as a physical reality, with substantial mathematical supports. He does not yet claim full mathematical proof, but his work is a guide post that unmistakably points the way. In one respect the theories of Le Sage and Challis coincide; the driving storm of atoms must come from outside the world of stars; the universe is not even temporarily automatic, but must be fed continuously by an agency external to itself. Our science thus is not a finality.

The law of conservation of energy, the child of the correlation of physical forces, was then considered in brief historical review, and it was claimed that Newton, Leibnitz, Huyghens and Bernouilli had laid some foundation for this discovery. The caution with which Lagrange presented similar mechanical principles was referred to. Physical science can only assert that it possesses no evidence of the destruction of matter or force. The conception of matter as moving atoms was as old as Lucretius. The ring vortex theory of Helmholtz in 1858 was a most important addition to the philosophy of the atomic conception. The element of the new physics is not an atom or a congeries of atoms, but a whirling vapor. The music of the spheres has left the heavens and descended to the molecules.

We have no conception of inert matter or disembodied force. All we know of matter is its pressure and its motion. If it could be shown that all the phenomena displayed in the physical world were simply transmutations of the original energy existing in the molecules, physical science would be satisfied.

The great problem of the day is how to subject all physical phenomena to dynamical laws. The obstacles are innumerable, but we shall not rest till they are overcome. We applaud with good reason the brilliant results of experimental research, but mathematical analysis with its multitudinous applications is the only key which will fit the intricate wards in the treasury of science. Through her mathematicians England holds to-day a position in science that she has not held before since the days of Newton. In Germany the physicists do not hesitate to grapple with the most intricate problems. In France the scientific spirit is aroused to a degree unknown since that which preceeded her first revolution. Her association for the advancement of science has sprung almost at birth into full grown power. The words of its first president are as true for the United States as for France: "The strength and glory of a country are not in its arms, but in its science."

Rocky Mountain Coal Field.

The following statement will indicate the general locality of the Rocky Mountain coal field, and is from reports made to the government land office:

	Area. Sq're Miles.	Coal Area. Sq're Miles.
Texas	237,000	30,000
Indian Territory	69,000	40,000
New Mexico	122,000	20,000
Kansas	80,000	80,000
Missouri	67,000	24,000
Nebraska	84,000	84,000
Iowa	55,000	24,000
Wyoming	67,900	20,000
Colorado	102,000	20,000
Montana	148,000	74,000
Dakota	150,000	100,000
Total	1,180,000	513,000
Add approximate coal area of British America		737,000
		1,250,000

In 1867 the workable coal area was 200,000 square miles; it is now ascertained that west of the Mississippi we have 513,000 square miles of true coal. In 1867 we had discovered 200,000 miles; thus, in North America, we have nearly 1,500,000 square miles in the very heart of the Continent.

THE NICHOLSON FILE.

All Nicholson Files are cut with the Patent *Increment Cut*, an invention owned and controled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at east) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformityof machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand for upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

Prices and terms will be forwarded on application to

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Providence, R. I.

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The American File Company have the exclusive right to use the Bernot process for cutting files By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

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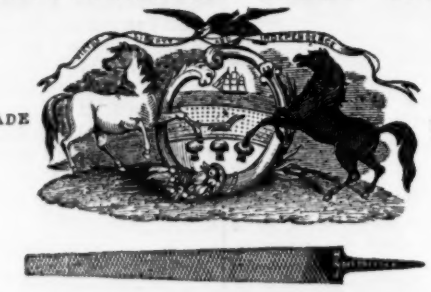
TRADE  MARK

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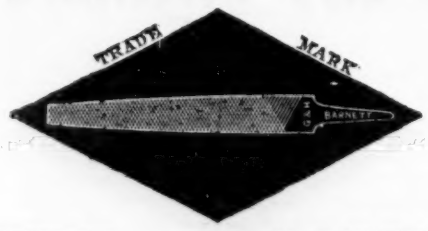

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"Patented" Furnace Charging Scale.

Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.

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HURD'S RAZOR BLADE AXES
MANUFACTURED FROM THE BEST ENGLISH EXTRA CAST STEEL BY THE JOHNSONVILLE AXE MFG. CO.

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Celebrated Hand-Cut FILES,

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In the face of strong prejudice against American files, this brand has earned a reputation second to none. The trade in all sections testify to their excellence. We confidently offer these files as superior in every respect and cheaper than any first-class file in the market. A trial will confirm their reputation.

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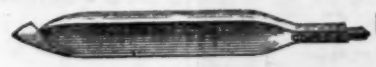

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Hartje, Wiley & Co.	William McNiece.	Klein, Logan & Co.
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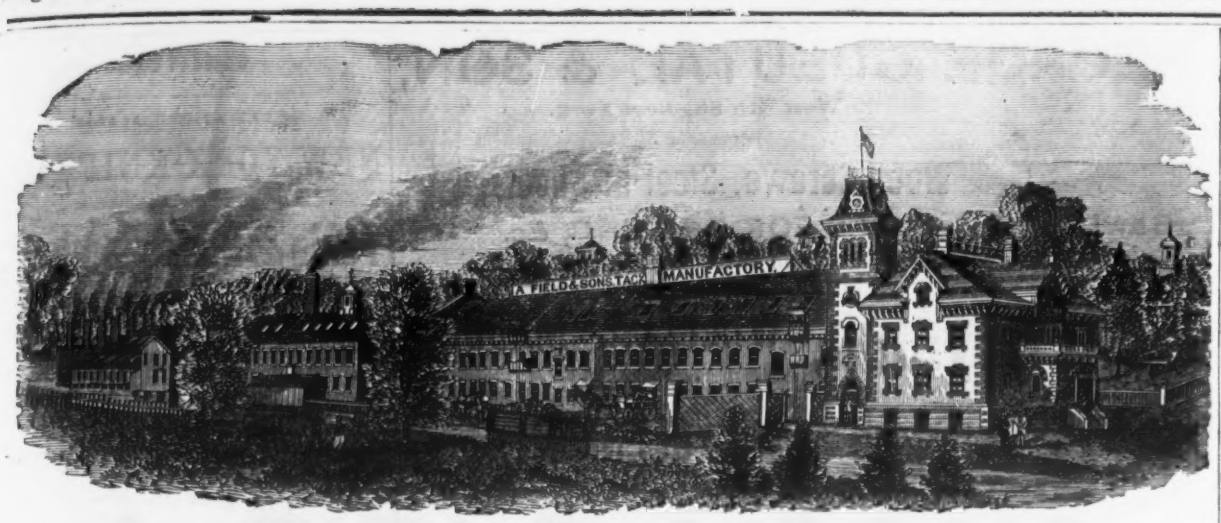

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To AMERICAN MANUFACTURERS we offer our services for the introduction, in Great Britain and the Continent, of MACHINERY and TOOLS of improved construction. It is now seven years since we established ourselves in London, and during that time we have succeeded in establishing a demand which is now rapidly increasing, thus proving the value of these goods throughout Great Britain and the Continent. We are now the European Agents for several leadin American Tool Makers, to whom we will give reference on application to either our London or New York house.

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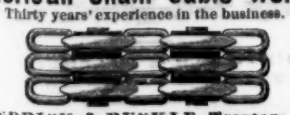
Thirty years' experience in the business.



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Manufacture Iron Chain of every description.
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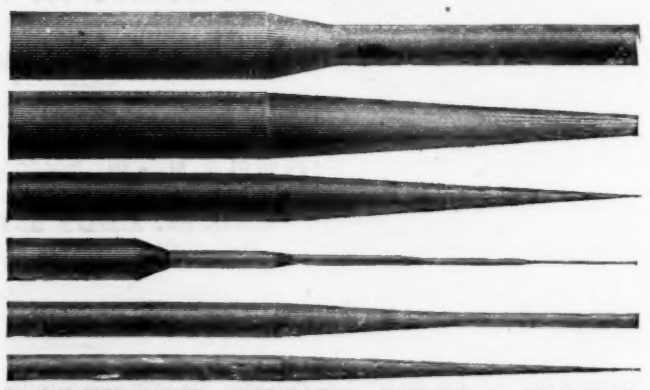

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Straight Polished Steel, Iron, & Brass Wire Cut to any Length & Exact Size.
Tapered Articles from either Round or Square Wire any shape or size. Also, Capewell's Giant Nail Puller.

GRANT'S LIGHTNING SCREW PLATE

The most perfect Labor Saving Tool ever invented for its purposes. Warranted to do five times the work possible with any other screw plate. Also *HAND BOLT CUTTING MACHINES*, ranging in price from $60 to $200. *POWER BOLT CUTTERS*, from $175 to $350.

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WILEY & RUSSELL, Greenfield, Mass.

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Manufacturers of
LOWMAN'S PATENT CAST STEEL
SHOVELS, SPADES & SCOOPS
Of all Descriptions,
Without straps or rivets, of the best English and American Cast Steel. Every Shovel warranted. Printed lists of prices and discounts to be had on application at the office.
SOLE AGENT,
H. K. DRAKE, 31 Chambers St., N. Y.

BUSINESS ITEMS.

NEW YORK.

The Skinner & Gifford Manufacturing Company, of Dunkirk, are manufacturers of railroad and contractors' track supplies, frogs, switches, hand, push and dump cars, steel scrapers, spike nails, claws, etc. Also machinery, mill gearing, fence railings, and other descriptions of iron work. The Missouri, Kansas and Texas Railroad Company has just ordered two of their improved cast iron turn tables, for Hannibal and Sedalia.

NEW JERSEY.

The first instalment of the Russian engines now being built by the Grant Locomotive Works, at Paterson, has been completed and is being made ready for shipment.

PENNSYLVANIA.

The North Cornwall and Bird Coleman furnaces, in Lebanon county, will soon be started.

The striking workmen of the Vulcan Iron Works, at Wilkesbarre, have been paid off. Soon afterward they held another meeting and again resolved not to work at the reduced rates. The iron company have obtained a few men from Scranton, and have received an offer from New York of "skilled Italian workmen, with an English-speaking foreman."

The Lancaster Bolt Manufacturing Company has been organized with a capital of $20,000. It is to be located in Lancaster, and the building will be 40x64 feet.

The Allentown *Chronicle* says: The Bethlehem Iron Company have recently received orders that will keep their works in operation for six months from this time. The company have, according to a Bethlehem paper, done a very generous thing in keeping employes at work during the panic, at a loss, and all good friends of the iron interests of the Lehigh Valley will be glad to hear the news that this corporation will now have a chance to recover some of its generous losses.

The Phœnixville Iron Company are at present engaged in the assembling and erecting of a deck bridge 200 feet in length, for Clark, Reeves & Co., to cross the Rio Remac, Peru, S. A.

The Sharon *Herald* says: We are reliably informed that, from present indications, the immense iron works of the Westerman Iron Company will be taxed to the utmost this fall and winter to meet the demand for their manufactures. The whole works are in operation now, the most of them running double turn.

MASSACHUSETTS.

The Springfield Armory will soon increase their production from 100 to 125 guns per day, which will give employment to those who were discharged in June.

D. M. Dillon & Co., of Fitchburg, are making two 50 horse-power boilers for the Putman Machine Company, of Fitchburg, to supply steam at the fair of the Massachusetts Charitable Mechanic Association, to be held in this city in September next. The boilers are to be of homogeneous steel made by the Bay State Iron Company, of South Boston.

The Black Lead Works, of Morse Brothers, of Canton, cover two acres of ground. The buildings are designated as the manufactory, grinding mill, store houses, stables, office, and fire proof engine-house. This last building cost $4500. The machinery is run by a J. C. Hoadley 50 horse-power engine. The Messrs. Morse are manufacturers of the "Rising Sun" stove polish, of which they turn out 10,000 packages per day. They also manufacture a lumberman's pencil, and a lubricator into which plumbago largely enters.

CONNECTICUT.

The Woodruff Iron Works, of Hartford, have recently finished one of their engines, of 40 horse-power, for the billiard factory of H. W. Collender; one for the New Haven Clock Company, of 200 horse-power, said to be one of the finest engines in operation; one for Gov. English's rubber factory, at Naugatuck; one of 100 horse-power for Gage & Moulton's new factory at Philadelphia; and one of 100 horse-power for Sampson, Hall, Miller & Co., of Wallingford, Conn. Beside the two large compound engines for the government now in process of construction, there are two other engines nearly done at the works, and orders are coming in liberally.

OHIO.

The Cleveland Boiler Plate Manufacturing Company are putting in a new engine of several hundred horse-power, their present power being insufficient. The company is running full time.

Thomas Kennen, of Cincinnati, has a large contract on hand for the Anchor Iron and Steel Works, Newport, Ky. Mr. Kennen is largely engaged in the sheet iron business, and is now making a new set of chimneys for the steamboat Arlington; and is also making a stack, 30 feet long, for the new side wheel steamer John Morgan.

Huron Furnace, Jackson, is nearly ready for work, but will not be put into blast until the iron trade revives. They are receiving stock ready for work whenever they think they will be justified in starting.

Messrs. Robt. Jones & Co., Cincinnati, have supplied the new planing mill, at Marysville, Ky., with a battery of four boilers, and are now making a set for the cotton batting works of Stearns & Foster. The new and extensive cigar box factory of Geo. Pelstring (recently destroyed by fire) is also receiving its boiler facilities from this estsblishment.

The Ironton Foundry, Means, Olhaber & Co., are now running on full time. They have just received 6000 bushels of coke. This, with a dextrous purchase of foundry iron, will make them busy for a time.

MISSOURI.

The St. Charles car shops have temporarily suspended work, after having finished their contract for 200 cars for the Iron Mountain Railroad Company. While running, 186 men were employed in the manufacture of cars. The directors expect to resume work in September.

The slag furnace of Davis & Murphy, at Joplin, is said to give satisfactory results. It has been running without intermission for several weeks, and has averaged seventy-five 80lb. pigs per day of sixteen hours, though it has made over 100 pigs in the time named.

WEST VIRGINIA.

The Wheeling Hinge Factory made a shipment to Toronto, Canada, on the 24th ult., notwithstanding, it is said, there is a hinge factory at Montreal.

The Wheeling Tack Factory, which run only four days per week in July, is expected to make full time in August.

Fisher's Foundry, at Wheeling, has been remodelled, and new machinery put in.

MICHIGAN.

The Munising Furnace, Marquette, made during the month of July 897⅞ tons—an average of 28·94-100 tons per day. Her largest run for any one day was 35 tons, and for one week 208 tons. There are very few charcoal furnaces of the same size, anywhere, that have done better.

The Greenwood Furnace, Marquette, blew out a few days ago, on account of the displacement of a few brick in her hearth or lining. She will go into blast again in a few days, if indeed she has not already blown in.

A New Mining Pump.

The London *Mining Journal* says:

The many new mines being opened out in nearly all parts of the country, and the serious loss of time, and money as well, which takes place in overcoming the water that has to be encountered, in most instances, renders an efficient and economical pump of the greatest importance. An invention of that character has just been secured by Mr. Tipping, consulting engineer, of Manchester, which promises to be of great interest to those concerned in sinking and general mining operations. The generally adopted means of reducing the disproportionate amount of power consumed in raising water from any depth in mines has been to put the pumping apparatus at the bottom of shafts, and force the water up a comparatively small pipe. There are however, a great many objections to that system, such as the inaccessibility of the machinery in case of explosions, floods, fires, or other accidents. By Mr. Tipping's invention the same effect is arrived at as that in placing the machinery at the bottom by retaining it on the bank, much in the existing style. With regard to engines, &c., the pump being, as usual, at the bottom of the shaft, the new invention does away with the jointed timber spear-rod, with all its multiplicity of fastenings, and constantly recurring break-downs, whilst the heavy, lumbering, costly to purchase, and more costly to erect, rising main is dispensed with, as is also the present form of bucket, whose packing is always either too tight or too loose. In lieu of these, the chief objectionable parts of the existing bank pump arrangements, a hollow cast-iron pump-rod is substituted, whose area for ordinary speeds is only one-ninth that of the pump; consequently the weight of water against which the engine has to work, and the power required, are only one-ninth; but as by the invention the weight of the pump-rod when falling squeezes up the water through itself, the rod must be as heavy as the water, and much heavier than that again, so as to overcome the friction, and enable the descent to be made quickly enough. As all this weight has to be raised again, in addition to that of the water, the whole will amount to two-and-a-quarter ninths, leaving an economy in power of three-fourths, the remaining weight of the rods being counterbalanced in the usual manner. In addition to the three-fourths of power saved in the lift, no power whatever is reqired for the down stroke. On the contrary, during the down stroke the rod must drag the machinery with it, in order that it might be kept in a state of tension. It might be that either with or without a thrust, in the absence of the usual guides, the rod would be liable to buckle, and be injured (although such ought not to be the case) in some one length of pipe; but that would not be a very serious matter, for the replacing of a 9 ft. length of pipe would not cause any great delay. The joints, however, are of a very simple though efficient construction, so as to meet all possible contingencies of strength and tightness. The bottom length of pipe rod is swelled out to the size of the pump, and works through a gland packed with ordinary rubber coils and well tallowed, or the present system of lubrication can be applied. It will thus be seen that such packing as is required can be effected by simply lifting the gland, and without losing any water from the pump.

It is evident that the sort of engine required for this pump cannot be too simple, as it requires no connecting rod, cranks, journals, shafts, gear, &c. The connecting rod from the L leg can be at once attached to the engine cross head, or other moving part, as the piston arrives at each end of its journey. The pump rod, when attached to the end of a beam arm, will have a radial motion, of no importance in a long rod, but where a straight uplift is required it can easily be provided. In the plain pump rod the spout will rise and fall on the rod being fixed to branches on to it; but when a stationary water spout, or delivery, is required, a very simple and effective contrivance meets the purpose—all the appliances in connection provide against any wetness whatever.

One of the great advantages of Mr. Tipping's invention is that it can be applied to existing pumps, to do which it is only necessary to remove the bottom length of the rising main and the spear rod with its spear and bucket, whilst the bucket halves can be used again. A more forcible idea of the economy of the new pump, putting aside the great difference in the first cost, may be formed by comparing the 8 tons weight of water in the rising main of a 15 in. diameter pump, 75 yards lift, with the 18 cwts. of water in the hollow rod, and the rod itself, complete, being not more than 3½ tons, at (say) £12 per ton, in total being much less than half the cost of an ordinary common spear rod, leaving the rising main and its fixing entirely out of consideration. It may also be said, as a strong argument in favor of the invention being adopted in mining operations, that from the small space the rods will occupy, they can, in most instances, be fixed in an ordinary drawing shaft, so rendering a special pumping shaft unnecessary.

H. W. PEACE,

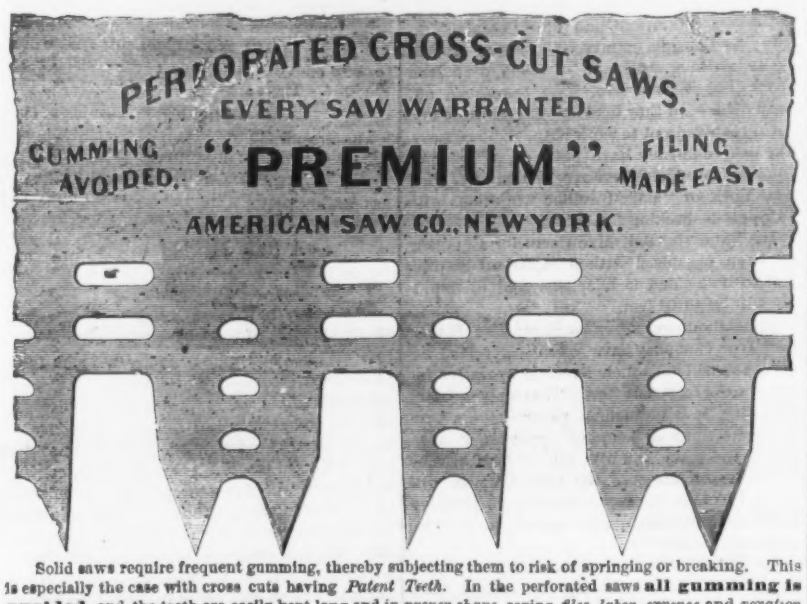
MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

TRENTON, NEW JERSEY.



Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having *Patent Teeth*. In the perforated saws **all gumming is avoided** and the teeth are easily kept long and in *proper shape*, saving *files, labor, expense* and *vexation* As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.

The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

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VULCAN SAW WORKS,
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THE SILVER STEEL

DIAMOND CROSS-CUT SAW.

$1.50 Per Foot.

PATENT HANDLES AND GAUGE INCLUDED.

Patent Secured

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So confident are we that this is the best Cross-cut Saw in the market that we CHALLENGE THE WORLD. Orders promptly filled.

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Dietrich's Patent Wood Saw. Guaranteed the strongest, lightest, easiest to strain or tighten and best braced wood saw made; also to give perfect satisfaction.

Dietrich's Patent Double Handle Rip Saw. All will readily see the benefit of this useful invention.

J. Flint's Patent Plastering Trowels. The best made and finished Trowels in the world. We make four grades of Plastering Trowels, from the best to the cheapest.

Our patent method of grinding hand saws makes them superior to any in the market.

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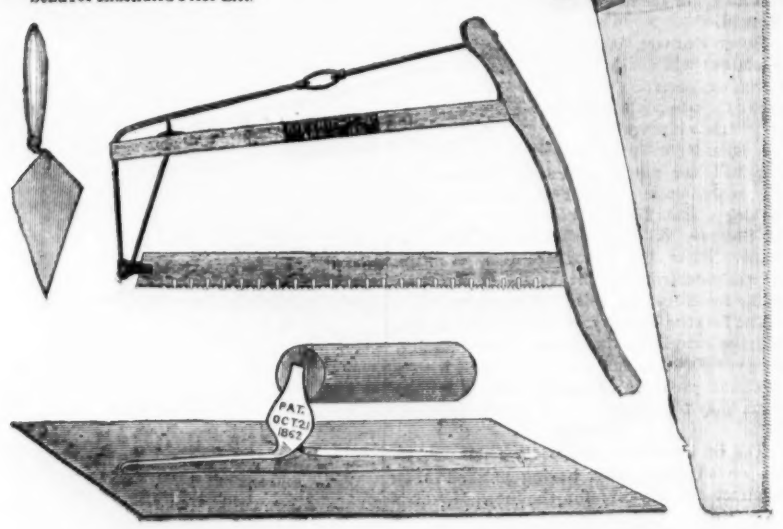

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Note extra steel and durability over the old **V**, outlined on **M** tooth.

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Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

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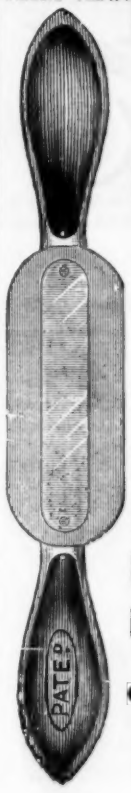
FRONT VIEW. BACK VIEW



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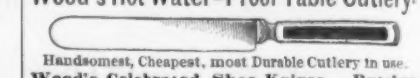

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CUTLERY AND RAZORS,
WASHINGTON WORKS, SHEFFIELD.

CORPORATE MARK.

FRED'K WARD & CO., SHEFFIELD,
CUTLERY & TABLE KNIVES.

CORPORATE MARK.

AMERICAN
PEN AND POCKET KNIVES,

MANUFACTURED BY *PEPPERELL,*

Aaron Burkinshaw. AB MASSACHUSETTS.

My Blades are forged from the best Cast Steel, and warranted. To me was awarded the GOLD MEDAL of the Connecticut State Agricultural Society; also a Medal and Diploma from the Mass. Mechanics' Ass'n Sept., 1869

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TABLE CUTLERY

OF EVERY DESCRIPTION. ALSO.

General Hardware,

IN VERY GREAT VARIETY.

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AWARDED THE MEDAL OF MERIT. LARGE STOCK OF VIENNA, 1873.

American, German, English

Pen, Pocket & Combination Knives.

Scissors, Scissor Cases,

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Isaac Milner's Fine Pocket and Table Cutlery.
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The only Knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the Best American Knife. We also make

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CELEBRATED CUTLERY,

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The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam Power.

To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

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Wholesale Cutlers.

Sole Agents for Wm. Clauberg's Warranted Pen and Pocket Knives, Razors, Scissors, &c.

SPECIALTIES:

Full Concaved Razors, Wostenholm's Pocket Knives, Razor Hones, Extra Leather Razor Straps. Butcher's Razors, Cutlery in general.

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George Wostenholm & Son,

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Celebrated I-XL Cutlery, Razors, &c

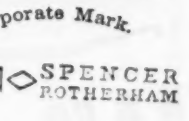
AGENT FOR

WALTER SPENCER & CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

Corporate Mark.



Granted 1777

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Agent for

F. W. HARROLD,

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JOSEPH ELLIOT & SONS,

Manufacturers of Razors, Table Knives, &c.,

SHEFFIELD.

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, August 17, 1874.

Those who accuse the iron manufacturers of the United States of being "Bourbons, who learn nothing and forget nothing," and there are such among the inventors, will at least admit that if the members of the trade were even to try every new method offered them, there would be absolutely no time to make any product for sale. What a commentary in metallurgy a collation of the various new processes for producing iron and steel would make. Not a week passes but your columns present from one to a dozen new, or supposed to be new, avenues of escape from the converting chamber or the crucible in steel, and from the blast furnace and the puddling furnace in iron. If the inventors would only tell us simply that they *do* the thing and how they do it, without giving a scientific treatise with each, generally as clear as mud to any reader, we could endure it; but, unfortunately, every one of them knows just why, scientifically, no one else knows anything. And what a mass of contradictions they oppose to each other! The majority of metallurgists say silicon is injurious to iron; the minority deny this. Mr. Pepper says silicon can never be alloyed with iron by using silicious ores in a puddling furnace. Dr. Nes and Codorus ore, as used by the Silicon Steel Company, have very nearly proved that it can; at all events making a steel which does not owe its properties to carbon, and must owe them to silicon or a mystery. Pepper further says that the heat of the puddling or heating furnace is insufficient to "silicate" iron. Iron puddled on a sandstone fix, instead of ore, will show all the qualities of puddled steel, with no more carbon than wrought iron averages. Any heater can tell that iron heated on a first sand bottom will be more or less *steelified* on the part in contact with the sand, which is so much in favor of Mr. Pepper's theory. Mr. Dupuy puts ore and carbon in a sheet iron box, and subjects it to heat and excludes oxygen, then reduces his bloom, sheet iron and all. Elbridge Wheeler makes steel with an iron *envelope* in the same way. Dupuy says no direct process for sponge will succeed in a column of ore, high or low. Wilson, a late inventor, says he does this practically in a high column, and Blair in a low one. In short, each one says the other cannot do just what the other says is the only way to do it, and the iron trade is called stupid and conservative and Bourbons because, in this mass of contrarieties, they do not welcome all with open hands. The trouble with steel processes is, that the outside public is afraid of them, and the *inside* trade have all the interest of investment in existing plant, reputation of product and credit against their introduction, and hence it is up-hill work for the inventor, however meritorious his idea may be. And yet out of all this is surely coming good. So many minds are not bent in the same project but that success must be evolved from some of them.

As above stated, if we could only have the practical (or impracticable) part of each invention, without the "reason why," it would save those of us who are earnestly looking for the coming steel, a great deal of unnecessary reading. We are picking up heart of grace in business here, albeit every spurt of activity gets a setback by some misfortune each week. All but the Centennial; that progresses steadily and has apparently safely survived the diseases of infancy. The South American governments seem particularly anxious for a chance to exhibit, and very numerous applications have been made from European manufacturers. Our iron manufacturers will have to exhibit against Sweden, Prussia and France, while this exhibition ought to settle the vexed question of American against English steel. The time for the reception of proposals for granite for the superstructure of the Memorial Building has been extended to the 22d inst., when the bids will probably be opened, and this will finish the principal contracts.

The Franklin Institute has now possession of the former freight depot of the Pennsylvania Railroad Company, and is proceeding to alter and arrange it. A special provision will be a supply of water in a tank ten feet deep, running along the building to enable a thorough test of pumps of all kinds. The most thorough competitive trial of steam engines ever made in this country will be had. This already attracts makers of engines.

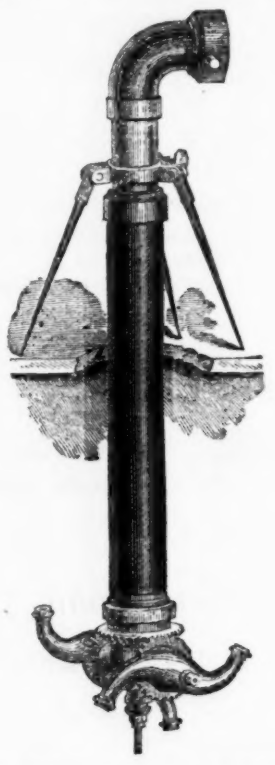
One engine which will be on exhibition will not compete for a premium. It is the "Golden Miniature Steam Engine," constructed by Cyrus Chambers, Jr., at the age of sixteen. Although it has before been on exhibition, the following description will doubtless prove interesting to many readers: It is a high pressure beam engine, constructed principally of gold and silver, and is composed of over one hundred and fifty pieces. The diameter of the cylinder is one-sixteenth of an inch; length of stroke, three-sixteenths of an inch; diameter of fly-wheel, five-eighths of an inch. The cylinder crosshead and beam are made of gold, the boiler silver, and in five separate sheets. The screws which hold the separate parts together are so small that they can scarcely be seen with the naked eye. The engine, boiler, stack and plate, on which the whole rests, weigh less than one-half ounce. It is believed to be the smallest working steam engine in the world, and will run three thousand revolutions per minute.

It would seem that we need not be greatly alarmed about the threatened reciprocity treaty with Canada, since the only parties in favor of it are the free traders of the United States. The English press has protested against it as likely to render the dominion independent of England, and now the manufacturers of Ontario, in conjunction with the Ontario Industrial Association, have expressed themselves as decidedly opposed to it. This the second demonstration against it by the Canadians, and shows that the people of both countries are not inclined to reciprocate. At last there seems a probability of a new railroad line from this city to New York. The North Pennsylvania Railroad Company has surveyed a line from here to Yardleyville, on the Delaware, thence to Bound Brook, New Jersey. The road will be built by the "Delaware and Bound Brook Company" under the late free railroad law of New Jersey. From Bound Brook the New Jersey Central Road will be the route, and the scheme is in the interest of the latter and the North Pennsylvania Company. Better time and lower fares are promised, but probably when the line approaches completion the great absorber will quietly lease it for ninety-nine years, and we will continue to pay high fares for a short ride.

A Water Distributor.

The New York Fire Department have adopted, and are at present using, a peculiar apparatus for scattering water in all directions, not in spray, but in well directed streams that reach to a considerable distance. In extinguishing fires a large amount of water is wasted because it is not directed upon the burning material, and, in many cases, the density of the smoke and the peculiar position are such that the efforts seem to be useless. This is particularly the case when fires occur in cellars or in the holds of vessels. In such cases the hose must frequently be dropped through the floor or the deck. The inventor of the distributor claims that it will obviate this difficulty, since it throws from its four nozzles, by what he describes as a double spherical action, a body of water from 60 to 100 feet in diameter, according to pressure. By the use of this improvement the delivery of the water is automatic, and the apparatus can be placed directly over a fire and allowed to remain unattended in places of great danger, and scatter the water and thoroughly saturate all materials within the reach of the jets of water.

By reference to the accompanying illustration the construction of the apparatus will be understood from the following explanation. The cut represents the distributor as having been inserted through the floor, a hole having been cut therein for its insertion, and the floor in front of the pipe removed. This represents one method of using it, and when the hose is attached to the curved pipe at the top, the water is discharged below with great rapidity. The stand pipe has hinged upon it three legs forming a tripod, by which it is supported. If desired, however, the revolving nozzles shown at the lower extremity of the pipe may be put upon a pipe having a frame and rollers, so as to be pushed along on a floor into a burning apartment.

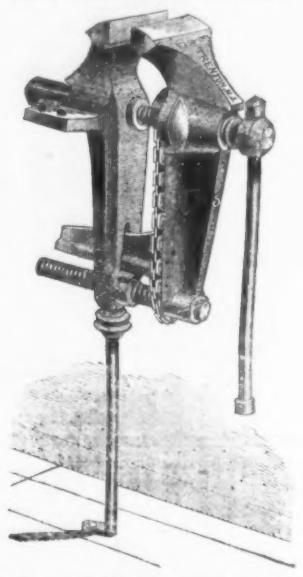


At the bottom of the pipe, as shown in the engraving, are two nozzles, each of which is shaped like an S, and are reactionary in their character. They are placed upon their respective pipes, which are connected with the main vertical pipe by a swiveled T tubular coupling that is free to revolve at the end of the vertical tube, being held in place by a bolt, which extends through the coupling and is seen at the lowest point of the illustration. The nozzles also revolve around the ends of the T. Each of the pipes which connect the nozzles with the T coupling are provided with miter gear wheels, as shown, which gear with the stationary horizontal miter wheel around the stand pipe. The water issuing from the jets cause them to revolve upon their own axis, and their miter wheels, which revolve with them, acting upon the stationary horizontal gear wheel, communicate a revolving movement to the nozzles, their connections, gears and the T pipe. The nozzles, therefore, have two motions, the combination of which causes them to describe a spiral path. By making the gears upon the nozzle connections with a different number of teeth from the stationary gear wheel, the issuing jets will describe a different "spherical cycloidal" path each time the T coupling revolves, until the revolutions have been sufficient to bring the parts to the place and relative positions at starting, and then the jets will describe the same paths over again. In this manner the jets of water will be caused to pass off in every necessary direction with great rapidity.

Where a greater depth is to be reached than the length of the stand pipe allows, as in the hold of a vessel, the nozzle can be detached from the stand pipe and attached directly to the hose. In cases of fires in narrow streets or alleys, the distributor can be used by suspending it from the roofs. For theatres, warehouses, grain elevators, mills, factories, etc., etc., the distributor can be made a fixture so as to have it ready for immediate use. The manufacturer is E. G. Hilton, 112 John street, N. Y.

Double Screw Parallel Leg Vise.

Fisher & Norris, Trenton, N. J., have added to their well known line of goods, a new pattern Leg Vise, which possesses some important points of novelty, presented for the first time in a vise of this character. The trade are already familiar with the Parallel Bench Vise made by the same establishment, the important feature of which is, the method adopted for gaining and preserving perfect parallelism. This vise is known as the Chain Vise, and is constructed with two screws connecting the jaws, instead of one screw, as commonly used; to these screws is attached a chain—very accurately made, of steeled links and rivets, which,



responding to the application of the lever, revolves both screws simultaneously, thus preserving perfect parallelism throughout the entire length of the side pieces which hold the jaws. In the new Double Screw Parallel Leg Vise, which we illustrate herewith, this important innovation has been adopted. The manufacturers claim that the new vise combines all the advantages of the "Peter Wright" leg vise, of strength and lightness, fastening to the floor and bench; is always perfectly parallel at all points, and never gets out of line. It is also claimed that this vise takes a tighter grip, and is the strongest vise on the market. The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping. The jaws are made of best tool cast steel, welded on, file cut and properly hardened. The screws are forged, of the best refined iron, and work in solid cut thread boxes. By a simple arrangement, not shown in the engraving, they can be made to swivel as in the common vises at a small additional cost.

The Large Manufacturers of Pittsburgh.

The Pittsburgh *Dispatch* publishes a list of manufacturers doing business in 1873 to the amount of $50,000, and over, taken from the assessor's lists. The following are the houses mentioned in the list representing the iron and steel industries, and the branches of manufacture of which iron and steel are the raw materials:

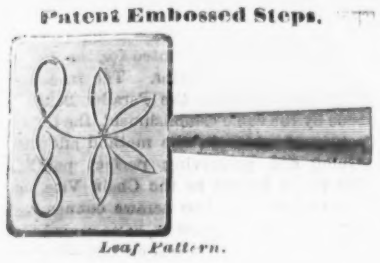
IRON.	
Jones & Laughlins	$2,750,000
J. Painter & Sons	1,439,600
Graff, Bennett & Co	914,700
Brown & Co	793,500
Shoenberger & Co	741,000
Lloyd & Black	540,400
McKnight, Duncan & Co	527,00
William Clark & Co	431,900
Everson, Graff & Macrum	425,000
Dilworth, Porter & Co	393,600
Zug & Co	74,690
STEEL.	
Hussey, Wells & Co	1,150,000
Anderson & Woods	917,300
Singer, Nimick & Co	879,600
Miller, Barr & Parkin	589,000
Park Bros. & Co	468,500
Pittsburgh Steel Casting Co	87,500
MISCELLANEOUS.	
Evans, Dalzel & Co., Pipes	624,000
C. G. Hussey & Co., Copper	595,000
A. French & Co., Springs	366,600
A. Hartupee & Co., Engines	326,000
Totten & Co., Founders	321,100
A. Garrison & Co., Founders	279,600
Park & Co., Copper	189,300
Mitchel, Stevenson & Co., Stoves	175,000
Jacobus & Nimick Mfg Co., Novelty Goods	173,100
Alex. Speer & Sons, Plows	155,000
Graff, Hujus & Co., Stoves	150,000
Wm. Miller, Forge	140,900
J. Marshall & Co., Founders	140,000
W. P. Townsend & Co	135,000
Bissell & Co., Stoves	113,000
N. Snyder & Co., Boilers	108,800
Schaal, Horveler & Co., Boilers	93,700
Lewis & Rossiter, Founders	90,000
L. Peterson, Jr. & Co., Founders	86,300
Dixon, Marshall & Co., Founders	78,600
A. Bradley & Co., Stoves	76,200
De Haven & Sons, Stoves	74,200
W. G. Price, Sr., Founder	68,600
McConway, Torley & Co., Malleable Iron	68,000
Klem, Logan & Co., Tools	60,800
Jno. B. Herron & Co., Stoves	59,400
Marshall Bros., Machinery	56,000
Brenuman & Wallach, Boilers	53,200

The Society of Forges and Founderies of Val d'Osne has recently opened in Paris an exposition of their curious products, consisting of objects of art in cast iron, some of considerable volume, which are covered with copper by the Gaudoin process. This operation admits of the deposition of copper upon cast iron without necessitating any previous coating of the latter. The difficulty of accomplishing this has been the scouring of the iron, the bath of chemicals hitherto used being incapable of thoroughly cleaning the metal. M. Gaudoin has found that very acid solutions are necessary to remove the oxides of iron which escape the scouring; but at the same time the acids do not attack the subjacent metal. Such a solution acts continually on the points upon which the copper is not deposited, and ends by dissolving the oxides and allowing the deposition to take place. A large number of organic acids have been found suitable for the purpose. The oxalates of copper combined with the quadri-oxalates of soda are said to give excellent results. An electric current is employed to secure the fixing of a thick layer of copper.

H. D. SMITH & CO., PLANTSVILLE, CONN.

Established 1850.

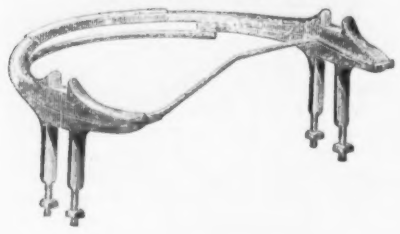
Patent Embossed Steps.



Leaf Pattern.

King Bolt Yokes.

No. 6 Fifth Wheels.

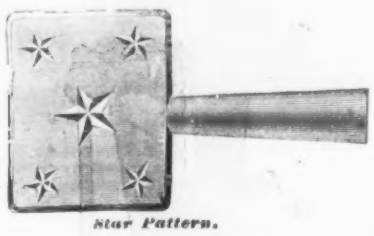


1871 Pattern Shaft Couplings.

Patent Cross Bar Steps.

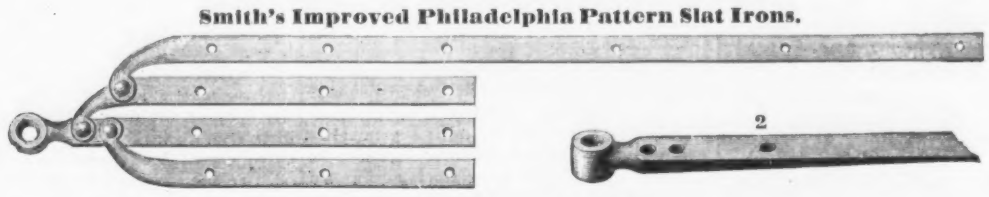
Upper View.

Lower View.

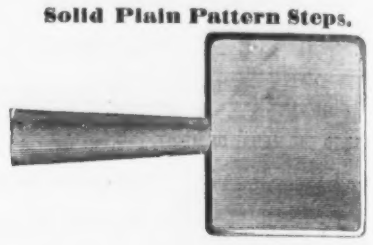


Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



Solid Plain Pattern Steps.



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CLARK, SMITH & CO.,

Green Jacket Axles. FORT PLAIN, N. Y. Fine Carriage Springs.

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English and Swedes Steel Springs, and Iron and Steel Axles.

Execute orders promptly for

Black, Bright, Tempered and Oil Tempered Springs,

Of any Pattern or Style. Also for **AXLES of any description, from a COMMON LOOSE COLLAR to the FINEST OF STEEL.**

Our facilities for manufacturing are very extensive, and with our recent additions of new and improved machinery, we defy competition.

Send for Price List and Descriptive Circular.

CARRIAGE BOLTS.

Buy the Best.

Clark's Patent Carriage Bolt.

Best Bolt manufactured for all kinds of agricultural machinery. Will not split the wood, and can not turn in its place.

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SOLID BOX VISES.

With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp Heads and Screws, Parallel Bench Vises, Sash Pullies, Ho House Pullies, Composition Cocks, Bench Screws, Vise Screws Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Relaying Pins, Marlin Spikes, Malleable Iron Castings, and Genera Hardware.

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Carriage and Tire Bolts,

NORWAY IRON,

Button Head.

QUALITY GUARANTEED.

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Carriage and Tire Bolts,

CHARCOAL IRON,

Beveled Head.

QUALITY UNSURPASSED.

The Celebrated "STAR" Brand of Axle Clips.

Blank Bolts, Wood Screws, Square Head Bolts, Plow Bolts, &c., &c.

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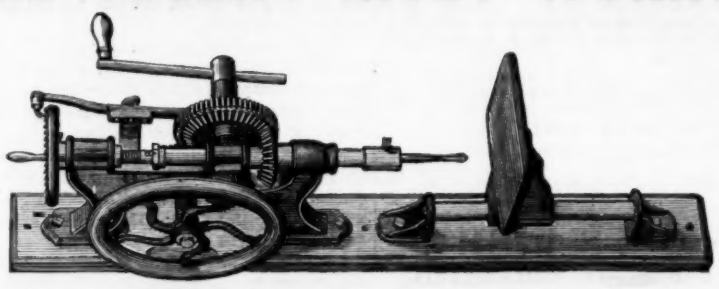
OLD COLONY RIVET WORKS.



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ESTABLISHED 1837.

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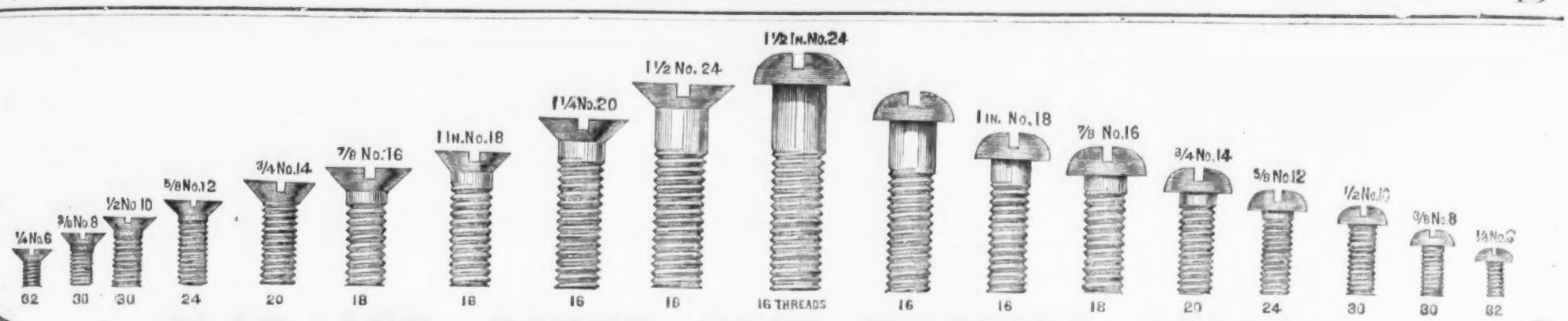

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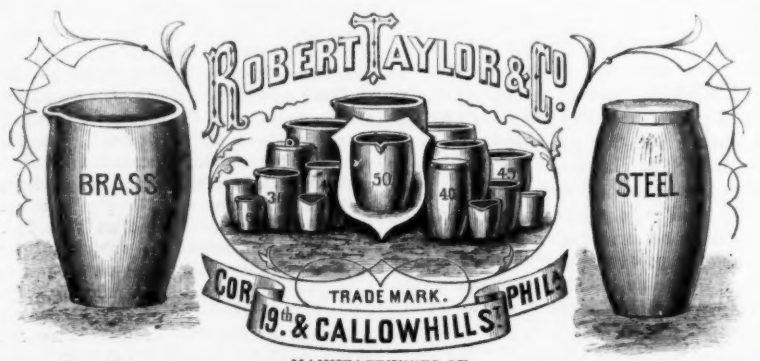

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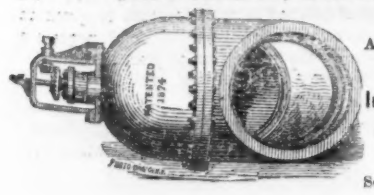

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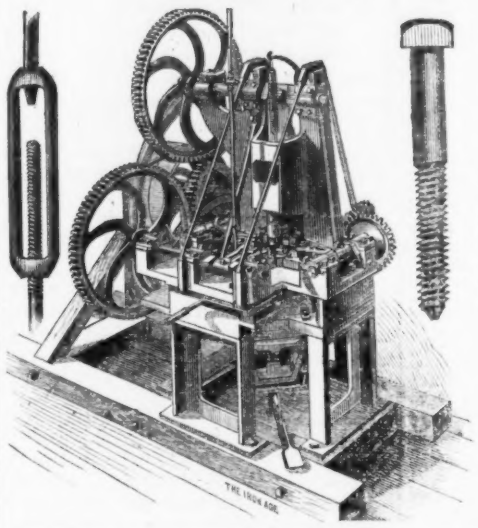

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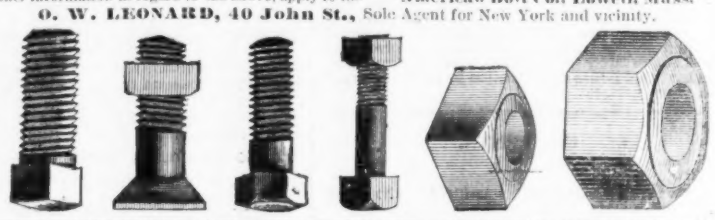

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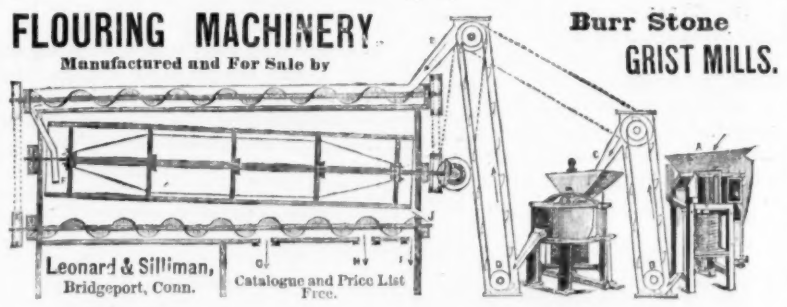

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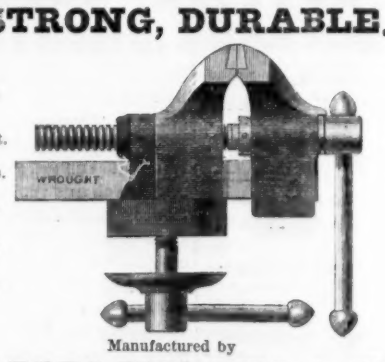

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DAVID WILLIAMS . . . Publisher and Proprietor.
JAMES C. BAYLES . . . . Editor.
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The Iron Age is published every Thursday morning, at No. 10 Warren Street, New York, on the following terms:

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West Virginia as an Iron Producing Region.

We are indebted to the Huntington (W. Va.) *Advertiser* and the *Engineering and Mining Journal*, of this city, for courtesies which claim recognition at our hands. The former, in its issue of July 25th, devotes its best column to an article intended to show that *The Iron Age* knows nothing whatever about the cost of coal mining and iron making in West Virginia; the latter, of August 1st, echos this article, and adds a protest against our venturing to speak ignorantly of a subject which it could tell its readers all about if it saw fit to do so. As the object of the Huntington *Advertiser* was to show that no place is as good as Huntington for iron making, we let it pass, assuring the writer that we have read his article. As the object of the *Engineering and Mining Journal* was obviously to attract the notice of *The Iron Age*, we will gratify it. It says:

In an article under this heading, in *The Iron Age*, we are told that Kanawha coal can be delivered on the cars at $1 00 per ton, and in Richmond at $3 00; that an expenditure of $2000 will open a mine capable of producing 52,000 tons per year; and other information scarcely less startling.

On the Kanawha, miners are paid 3c. to 3½c. per bushel, or, say, 80c. to $1·00 per ton; to this must be added hauling, handling, and other general expenses, and interest and royalty, which alone is from 14 to 28 cents per ton; and the cost on cars would be nearer $1·50 than $1·00. By reference to our table of freights on Bituminous coals, in another column, we see that the freight on Splint coal from the Kanawha region to Richmond is $3·76; on Cannel coal $5·35; and Splint coal is quoted in Richmond to $5·50—a price on which there is very little profit either to the miner or dealer.

Those who have tried with a capital of $2000 to open a colliery to produce 50,000 tons per year, know how utterly absurd these figures are.

In the same article an estimate is given of the cost of making pig iron "at furnace at mouth of Gauley or Ohio River," at $12·53; freight from that point to Cincinnati is $2·00 per ton; to Alexandria, Va., $3·50; thence to New York, $1·00 to $1·50.

We would remark, *en passant*, that the mouth of Gauley is by no means on the Ohio, but is nearly 100 miles from it; nor is it even on navigation on the Kanawha. If the furnace be on the Ohio, the freights East must be very considerably increased and the cost of material used increased by additional freights on coal and ore. West Virginia coal and iron are good enough and abundant enough to do without the systematic exaggeration which we find circulated by the press throughout the country. Professor Anstead is quoted as the authority for not a few gross exaggerations, whether they be in the form of a report saying that the Gauley River is a navigable stream, or that the thickness of workable coal at the "Hawk's Nest," on the New River, is 70 feet, in veins of from 4 to 10 feet thick.

That the statements made in the article referred to, are based upon the very best authority upon the subject at issue—authority, let us add, fully equal to the dictum of the editor of the *Engineering and Mining Journal*—may be seen from the following quotations. Referring to our article, we stated as follows: "The facilities for "mining this coal are, from its position "and depth, unequaled, and it has been estimated that an expenditure of $2000 "will open a mine capable of producing "1000 tons weekly, or 52,000 tons per annum." In his "Report on the Agricultural and Mineral Resources of Virginia "and West Virginia," Hon. Howell Fisher, a civil engineer, geologist and, moreover, a practical iron manufacturer of some note, speaks as follows (page 12):

It has been stated before that the chasm of the river Gauley renders it most peculiar service in its relation to the coal. Cutting all the coal strata for nearly its whole length entirely through, and getting down among the shales under the coal, the river has caused the numerous streams which pierce this whole coal region to cut down through most of the coal-bearing strata on their courses, leaving the coal entirely above water level, accessible at hundreds of points by simply scraping off the surface soil; *so that, so far as the mere getting of the coal is concerned, two thousand dollars will open a mine ready to ship one thousand tons per week.* There is no region in the world where less physical labor will prepare a mine for delivery of coal at the drift's mouth.

As to the cost of coal on cars being $1 per ton, we are assured by owners of coal lands in the vicinity that contracts can be made at this figure. As to freights from the mouth of the Gauley to Cincinnati being $2, W. H. Edwards, Esq., president of the Ohio and Kanawha Coal Company, testified before the Senate Transportation Committee (see pp. 463 and 466, Report) that it cost them $1·25 to $1·40 freight from there to Cincinnati; that coal at $2 per ton paid them a profit delivered on their boats or on the railroad, and that they had on their lands thirteen seams, which contained 52 feet of coal.

Professor Anstead's authority has been considered in this country and abroad as good as that of most experts, and by the commercial world as of sufficient value to justify the investment of large sums of money—an amount of confidence not always bestowed on *all* "Professors," whether of native or foreign extraction. If *The Iron Age* is guilty of "gross exaggerations," Prof. Anstead must bear the blame, since we quote him *verbatim*. Before the Senate Transportation Committee (pp. 453, 456 and 457 Report) Prof. Anstead testifies that "he examined the formation "on the Gauley Mountain, near Hawk's "Nest, and reports from *fifty* to *seventy* feet "of *workable coal*, all above water level, "consisting of veins from *four* to *ten feet* "thick." In an address delivered before the Society of Arts, on the Coal and Iron of Virginia, Prof. Anstead states as follows:

Commencing at Mill Creek, near Hawk's Nest station, of the Chesapeake & Ohio Railway, we find in Gauley Mountain, which rises behind the station to the west to a hight of 2500 feet above the railway, an unusual thickness of workable and valuable seams. There is here about 60 feet of workable coal in a number of seams within a thickness of about 800 feet of measures. One of the lowest workable seams has been lately opened for work, and is found to contain, about 1000 feet above the railway, at least 10 feet of hard, compact coal, of the splint and bituminous varieties, and above this are other seams equally valuable. The upper seams include cannel.

Further, in a letter to Gen. A. A. Humphreys, chief of engineers of the James River and Kanawha Canal Survey, Gen. Q. A. Gillmore writes from New York, March 19, 1870 (see report to Committee on Railways and Canals, House of Representatives, Ex. Doc. No. 210, pp. 18 to 29), as follows:

With regard to the quantity of coal that can be mined annually from horizontal seams, and brought out through a single tunnel, it may be remarked that a company controlled by English capital has recently begun operations in Gauley Mountain, about three miles from the Hawk's Nest station of the Chesapeake and Ohio Railroad, in the expectation of mining 300,000 tons of coal annually. They have tunneled into the side of the mountain through their lowest coal seam, *which is eleven feet thick*, and will communicate from this tunnel with the upper seams through a vertical shaft, through which all the coal from the higher levels will be delivered to coal cars in the main tunnel, and thence by a double track narrow gauge road, to the Hawk's Nest station.

Major Craighill, of the Engineer Department, U. S. A., on same subject testifies to the same effect.

Thomas S. Ridgway, of the Geological Survey of West Virginia, in his geological report to the Chesapeake and Ohio Railroad Company, 1872, says: "Just below the "mouth of the Gauley River, at Cannel"ton, five seams of coal alone aggregate "twenty-nine feet, consisting of each of "the four valuable coals; there are fifteen "seams exposed above the water level, and "eleven of these seams aggregate fifty-one "feet of workable coal."

Daddow & Bannan (Coal, Iron and Oil, p. 340, &c.) give as their measurements on Coal River, commencing at the bottom of the seams, as follows: 2, 6, 3, 5, 3, 2½, 3, 2, 2½, 10, 6, 4, 5 and 3, in all 14 veins, and averaging over four feet thick, or literally, "from 4 to 10 feet thick."

The authorities we have quoted are sufficient, certainly, to bear out our statements of the great extent and value of the various coals of the region referred to. The estimate of the cost of making pig iron quoted, and the cost of freights, whether from the mouth of the Gauley or on the Ohio River to Cincinnati or Eastward, were furnished by very excellent practical authority in the region, and we are not willing to change them until we have better reasons for doing so than the *Engineering and Mining Journal* has furnished. Our only regret in the matter is that a journal which purports to be an authority on mining, and which has a "coal and iron editor," should undertake to contradict facts simply because it is ignorant of their truth. In the future, as in the past, we shall probably supply the *Engineering and Mining Journal* with "other information scarcely less startling."

Pushing Business in Dull Times.

For some months past we have, as our readers know, looked forward hopefully to a good fall trade, and we are not yet certain that our expectations will not be realized. Such predictions as we ventured to make were based upon the best information at our command, and under like circumstances we should inevitably reach the same conclusions. It cannot be denied, however, that the fall trade is backward, and that many of those who were most confident of an active and profitable business during the last quarter of the year, are equally confident at this time that a general revival of trade cannot be looked for before spring. The whole nation is trying to practice economy, which is, at best, the road to future prosperity through present dullness. The effects of the panic still linger, its debts are still unpaid, and until we shall feel the addition to our national wealth which comes of full harvests, we may continue to suffer from commercial inactivity.

In view of all the probabilities and possibilities of the future, however, it must be admitted that there is reason for confidence, as well as for the gloomy feeling which pervades business circles. The aggregate of the fall and winter trade, though late—and it comes later every year—may realize reasonable anticipations, or it may disappoint them. But whatever the immediate outlook, no enterprising and far-sighted business man will deny that this is a time in which it is the part of wisdom to take counsel of our hopes and not of our fears. The merchant or manufacturer who, confident that trade will languish a few months longer, abandons all effort to stimulate it, and contents himself with the avoidance of large losses, may derive what satisfaction he can from the thought that he is doing all in his power to bring about the condition of affairs which he most dreads. We counsel prudence and economy, and advise every one to conduct his business carefully and with judgment; but we do not advise supineness, nor do we see any reason to fear the consequences of well directed and sustained enterprise. When the wind is light and the sky clear, the mariner does not reef his sails and wait for a gale to waft his vessel forward on its voyage; but he spreads the more canvas that he may catch every breeze, and while he may not make rapid progress, he at least secures steerage way and keeps to his course, which is better than drifting or lying at anchor. Among manufacturers and merchants there is too much disposition, in times like these, to make slight efforts to stimulate trade. The consequences are just what might be expected. They do little and get little, and by the end of the season their worst fears are realized. We do not say that a different policy would have secured them as much business as they would have had in times of general prosperity, but they would have kept their customers, extended their correspondence, introduced their goods into new markets, put themselves in a position to take immediate advantage of any improvement, and trade would come to them before others had begun to make preparations to seek it. Of course, no two business men are situated exactly alike, and each must conduct his business with regard to circumstances which he alone can take into account; but we have no hesitation in saying that a do-nothing policy in dull times is the worst possible policy, and that whether trade is good or bad, it is the part of wisdom in the business man to secure all he can of it, by the very means he adopts in seasons of general activity.

We have now reached a time when the necessities of the country will force buyers for the retail trades into the market. We must not suppose that economy of consumption means no consumption, or that dullness in trade means stagnation, or anything approaching it. Between this and spring merchandise of all kinds, to a vast aggregate value, will have passed through the several hands of the manufacturers, jobbers, retailer and consumer. Those who secure a share of this trade will certainly do better than those who do not, and the same means are necessary to secure it now as when the aggregate of business done is much larger than it is likely to be this fall and winter.

Steamboat Inspection.

A Washington dispatch, announcing the removal of the late Supervising Inspector General of Steamboats, says: "The "government has been unable to fill the "position with a person thoroughly com"petent to perform the duties. Mr. Smith "is the third failure since the office was "created." This is probably true, and it certainly furnishes a strong argument against any further effort to sustain a useless Bureau. To enforce the law justly and strictly in a country of such extent, where the executive duties of the Bureau must be largely entrusted to local inspectors who may or may not discharge their duties honestly and faithfully, is a task which no man could perform, and engineers of recognized ability and large experience, even if not otherwise more profitably employed, would hesitate to risk their reputations by accepting an office which they could not fill creditably and successfully. The result will be that candidates for the executive offices of the Inspection Bureau will be found among the class of men who have no professional reputations to lose, and who seek offices because they can make money by the corrupt exercise of official power. It has already been shown that the steamboat inspection law has been made the means of forcing the adoption of many patented articles for which a market could not otherwise have been found, and at a recent meeting of the Steamboat Engineers' Association, it was shown how the power of the Bureau could be used for blackmailing purposes. If Congress must legislate on this subject, let it be by the enactment of general laws, making steamboat owners responsible for life and property committed to their care, and then leave them free to adopt whatever means they may consider necessary to insure safety. With all deference to Congress, we do not consider that body competent to prescribe rules and regulations for the safe running of steamboats, especially as the government is confessedly unable to find an engineer both competent and willing to take charge of the Inspection Bureau. All that is necessary is to definitely fix the responsibility where it properly belongs, and any evils which the inspection system is designed to correct will correct themselves.

Who Wants It?

Knowing as all do, who have given any attention to the subject, how strong the feeling is among manufacturers in this country against commercial reciprocity with Canada, it is interesting to learn how the question is regarded by manufacturers on the other side of the line. At a meeting of Canadian manufacturers, held in Hamilton, Ontario, on the 12th instant, reports were presented from committees representing various industries, which are summarized by telegraph as follows:

Committee on Machinery: That this committee, while in favor of reciprocity trade relations with the United States in so far as they embrace the natural products of the two countries, cannot but view with alarm the effects of the proposed treaty on the various manufacturing interests of Canada. The Woolen Textile and Manufacturing Committee reported that after a careful study of the reciprocity treaty in so far as it affects woolen industry, are of the opinion that this interest will be most seriously affected. The Cabinetware Committee reported that on the question of carriages and parts thereof the committee were equally divided in opinion, and that so far as it related to the manufacture of woodenware, such as tubs, pails, handles, &c., the treaty would be an advantage. The Boot and Shoe Committee reported that they most decidedly and emphatically protest and object to the reciprocity treaty with the United States, or Free Trade in any shape or form in the boot and shoe business. The Cotton Fabric Committee reported that the treaty is so indistinct on this question, and the explanation of the *Globe* so unsatisfactory, that it was impossible to arrive at a just conclusion; but, so far as could be seen, the field of operations would be materially lessened and trade diverted. The Paper Manufacturers Committee reported that the paper trade would not be seriously affected by the treaty were British paper not also included, although paper mills in the States are now becoming very much concentrated, thus giving them a very material advantage over our isolated mills. Yet, to secure reciprocity in agricultural products, we would cheerfully submit to reciprocity in paper.

Who, then, wants reciprocity? The only parties in interest who want it seem to be the Canadian lumbermen and manufacturers of wooden ware. Were the question canvassed among American manufacturers as it ought to be, the protest would be overwhelming. Let the suggestion be adopted. Meetings of manufacturers at different centers to draft protests against the approval of the treaty, which paid agents of the Dominion government, are trying to thrust down the throat of the Senate with the specious plea that the bitter pill is sugar coated. Some expression has already been given to the national sentiments against this entering wedge of the free trade movement, but it is not one-tenth part strong enough, and if the manufacturers of this country do not manifest more interest in the matter, they may find that the intrigue has succeeded, and that border smuggling and unrestricted foreign competition are practically legalized for the next twenty years.

New Publications.

INTRODUCTION TO THE RESOURCES OF TENNESSEE, by J. B. Killebrew, A. M., assisted by J. M. Sanford, Ph. D., M. D., C. W. Carleton and H. L. Bentley. Prepared under the direction of the Bureau of Agriculture.

This volume is the result, in part, of the work done by the Tennessee Bureau of Agriculture since its establishment in 1872. Its publication has been delayed simply because of the amount of work requisite to its proper preparation, and of the unwillingness of the Bureau to send out an unsatisfactory and unreliable report. It embraces a general review of the agricultural, mineral and industrial resources of the entire State, with brief notices of each county, and no pains have been spared to obtain the facts. All localities of special interest have been visited—the coal fields, iron belts, and the best as well as the poorest agricultural sections. Altogether, the preparation of the report has involved a travel of 15,000 miles by Mr. Killebrew and assistants, and has necessitated the writing of nearly 2000 letters, beside circulars. It has been the chief aim to make a reliable, rather than a popular, report, and facts have been stated impartially and without exaggeration. No considerable industry has been overlooked, no valuable resources left unnoticed, no subject in which strangers would probably feel an interest left untouched. The great leading idea in its preparation has been to give just such information about the State as ordinary unscientific men would like to know. Capital and enterprise being greatly needed, every subject calculated to attract them to the State has been touched upon. But it is not claimed that the work is perfect. It is only an introduction to the resources of the State. Tennessee is too large, too varied in its rough wealth, too diversified in its industries, too magnificent in its possibilities to be exhausted in one, two, or a dozen reports. But while it is by no means perfect or exhaustive, it will compare favorably with similar reports in this country, or in England.

As we published, from advance sheets, in May and June last, all the matter contained in the report relative to the coals and ores of the State, there remains but little, of especial interest to our readers, for us to notice in detail.

GAZETTEER OF RAILWAY STATIONS IN THE UNITED STATES AND THE DOMINION OF CANADA, &c. By W. F. Allen. National Railway Publication Co., 233 South Fifth street, Philadelphia.

This is a volume of four hundred and forty pages, of the dimensions most convenient for use, and contains much valuable information. The first pages after the general index are devoted to a "List of the Railroads in the United States and the Dominion of Canada, with the names of the Express Companies delivering and receiving on each;" also showing the gauges of the several roads, and a "List of Old and New Names of Roads," naming over six hundred titles by which certain roads were formerly known, with their proper designation at the present time. This list is a feature of no little importance. Forming the main body of the book is a list of all the "Railway Stations in the United States and Dominion of Canada," giving their location as to county and State, and line of railway, and designating such as have post, money order, express, and telegraph offices attached to them. Not the least important feature of this portion of the book is a very full statement of the population of the several towns, much fuller than can be obtained from the census of 1870. Following this is an "Express Directory," of Wells, Fargo & Co., showing how to ship to all points on the Pacific Coast, and several tables of river distances, towns, &c., with the same detailed information that is given in the list of railway towns. Several pages are devoted to the "Location of piers in the cities of New York, Philadelphia, and Boston, and Baltimore."

A useful feature of the work is a list of counties, county towns, and the times at which the

several terms of court are held. This information is of value to business men who have to sue for the collection of debts.

There are many other valuable tables in various parts of the book. In fact, few volumes of the size contain as much useful information. The work has evidently been very carefully compiled, and as the means in the hands of the compiler for obtaining the data have been unusually good, the work may be accepted as trustworthy.

Scientific and Technical Notes.

A decidedly novel improvement in electric telegraphy consists in the transmission of

MUSIC BY TELEGRAPH

by an apparatus devised by Mr. Elisha Gray, of Chicago. Such noted electricians as Mr. Geo. Prescott say this discovery of Mr. Gray only goes to prove what all electricians have long agreed upon, that we know little at present of the possibilities of the future of electric science. Mr. Chandler says that he regards it as the first step toward doing away with manipulating instruments altogether, and that he believes that in time the operators will transmit the sound of their own voice over the wires, and talk with one another instead of telegraphing. The writer has seen this novel instrument at work, and has heard music played on a small melodeon, or piano key-board, transmitted through an unbroken circuit of 2400 miles, and reproduced on a violin attached to the receiving end of the wire. The apparatus, by means of which this extraordinary feat in telegraphy is accomplished, has been named by Mr. Gray the telephone, or, an instrument designed for the purpose of transmitting sound to a distance. It consists of three general parts; first, the transmitting instrument; second, the conducting wire, running to a distant point; and third, the apparatus for receiving the sound at that distant point. The transmitting apparatus consists of a key-board having a number of electro-magnets corresponding with the number of keys on the board, to which are attached vibrating tongues or reeds, tuned to a musical scale. Any one of these tongues can be separately set in motion by depressing the key corresponding to it. Thus a tune may be played by manipulating the keys in the same way as those of an ordinary piano or melodeon. The music, produced entirely by electricity, of these notes is so distinctly audible in the next room that, in spite of much talking, there is no difficulty in determining what tune the manipulator is playing. To this transmitting instrument the conducting wire is attached, the other end being attached to the receiving apparatus, which may be anything that is sonorous, so long as it is in some degree a conductor of electricity. A violin with a thin strip of metal stretched between the strings at a point where the bridge of the instrument is ordinarily placed, will, on receiving the sound transmitted through the conducting wire from the piano, give out a tone very similar in quality to that of an ordinary violin. If, then, the metallic strip is electrically connected with a wire, say 500 or 1000 miles long, which has its distant end properly connected with the transmitting instrument, any one at the receiving end can distinctly hear, without the aid of electro-magnetism, the tune or air which is being played 500 or 1000 miles away from him, if he properly manipulate the receiving apparatus. The length of the wire connecting the transmitting with the receiving apparatus may be one mile or 10,000 miles, provided that the insulation is sufficiently good to prevent the escape of the electric current before it reaches its destination. In fact, there seems to be no limit to the distance to which sound, of any desired pitch, may be thus conveyed with from two to five cells of battery, all the conditions being proper. The quality or *timbre* of the tones depends upon the character of the receiving apparatus, which may be a violin prepared as described above, a tin hoop, with foil paper heads stretched over it, after the fashion of a baby's rattle, a nickel five cent piece, an old oyster can, and a thousand other things. A sound sufficiently loud to read Morse telegraphic characters, made by interrupting, with the common telegraphic key, one sustained note has been obtained, under favorable circumstances, at the receiving end of the wire without any more scientific sounding apparatus than that of a piece of common tissue paper. Aside from the intense interest which this discovery will naturally excite in the scientific world—as to the causes which produce this extraordinary electro-physiological phenomenon, and the gratification it will afford to all lovers of the marvelous—it is evident that, although the practical uses to which it may be put cannot as yet be recited, quite enough has been demonstrated to show that, from its basis, a new system of telegraphy, both for aerial and submarine lines, of a simple, rapid, and economical character, can be introduced. Mr Gray has applied for patents of his invention in this country and in all the countries of Europe.

An effective method of

CLOSING SMALL HOLES IN GAS HOLDERS,

is described as follows:

The hole is first made perfectly round, then a piece of lead pipe which just fits the hole is closed at one end and expanded at the other, and inserted into the hole. The piece of pipe is cut off an inch from the hole, some cement put around the outside, and the projecting edge hammered down. A conical plug of wood is driven into the pipe, which expands it so that the edge of the sheet iron cuts into the outside of the pipe. The plug is now taken out and the cavity filled with cement. When the hole is large, the plug is sawed off and left in the hole, or the hole can be filled with lead.

Dr. C. Kunzel, the inventor of phosphorus bronze, expresses the opinion that

A GOOD METAL FOR BEARINGS

ought not to be homogeneous, but should consist of two alloys of different hardness. The harder of these should be a porous mass which form, to a certain extent, the skeleton of the whole, and its pores or cells should be filled with the softer alloy. After a series of experiments Dr. Kunzel has taken an English patent for the following alloy: One-half to three parts of phosphorus, 4 to 15 parts of lead, 4 to 15 parts of tin, and a sufficient quantity of copper to make 100 parts. If the cellular portion is required to possess unusual hardness the following proportions may be employed: One-fourth to two parts phosphorus, 4 to 15 parts lead, 4 to 5 tin, 8 to 15 parts zinc, and copper up to 100 parts.

Prof. Tunner remarks that it is customary to attribute greater strenght to

COLD ROLLED IRON

than to that which has been rolled hot. Although experiments has shown that such is the case with new iron, yet this is of little importance in practical use, because it does not last. The strength of such iron, says Prof. Tunner, decreases gradually with time. This is a question which it would be well to determine by experiment.

Shott proposes a simple method of

DETERMINING THE MELTING POINTS OF DIFFERENT KINDS OF IRON,

which consists in taking from the furnace or cupola a quantity of melted iron and throwing it into a measured quantity of water—say 48 kilos.—which is stirred rapidly and its temperature measured. The water can afterward be poured off and the iron weighed. If D and d represent the quantity of water employed for two experiments, C and c the quantity of iron, W and w the quantity of heat, and B and b the change of temperature of the water, we have:

$$W : w = \frac{BD}{C} : \frac{bd}{c}, \text{ or, as } D = d = 48 \text{ kilos.},$$

we have $W : w = \frac{B}{C} : \frac{b}{c} = Bc : bC$, hence

$$w = \frac{WbC}{Bc}.$$

This process does not, of course, permit of an accurate determination of the absolute melting points, but gives the approximate difference in the relative melting points, if the liquid iron is poured into the water at a certain stage of its fusion, when the mass is in constant and regular motion.

The London *Mining Journal*, in an article on

CARBONIC ACID GAS AS A MOTOR,

says: Our readers are well aware that from time to time various substitutes for steam, as the motive agent of engines, more or less similar to those which are in ordinary use, have been proposed. It cannot be said that as yet any have been attended with that practical success which was to be desired. This is, however, no reason why further efforts should not meet with a more favorable result, and we have had laid before us certain proposals which appear of a very valuable character; though, of course, in this, as in other matters, experience will have to decide the problem.

Carbonic acid gas naturally suggests itself as a likely subject for experiment. It may be reduced into a liquid state by the compression of its own molecules under a pressure of some 33 atmospheres, and the merest tyro will at once see what an immense reservoir of force carbonic acid gas so treated must be. Dr. D. W. Gwynne, noting this, has for some time been engaged in devising means for utilizing this property of CO_2, and has arranged a complete system for its production and application, the plans for which were forwarded by him to the Earl of Caithness some six months since.

Dr. Gwynee generates his CO_2 by the treatment of some substance containing it in combination by an acid. Limestone, chalk, the carbonates of the alkalis, &c., would yield an inexhaustible supply, and the acid might either be sulphuric or hydrochloric. Where economy of space is a consideration, a bicarbonate of an alkali could be employed, but under ordinary conditions chalk or limestone would answer every purpose. The chalk, or whatever else was employed, would be acted upon by the acid in a closed receptacle or generator, a general idea of which would be supplied by one of the cylinders used in the manufacture of aerated waters. The generator would be fitted with a gauge, and suitable means for attaching it to a receiver. A double cock or collar would serve to cut off the connection with the receiver, and the gauge would show the pressure. The receiver represents precisely the steam chest of an ordinary steam engine, and as such an engine may, and often does, have several boilers, so to each receiver may be attached any number of generators required, determined by the needed amount of power. From the character of the fittings one or more generators may be removed or replaced without interfering with the tension of the gas in the receiver. Under the receiver Dr. Gwynne places a small furnace; and as the tensive power of the gas is greatly increased by the addition of heat—1·480 volume for each degree—the value of this arrangement will be seen.

By Dr. Gwynne's process it is easy to obtain gas which would exercise a power of 30 atmospheres without liquefaction. Such a pressure, however, would, in his view, never be required, and any graduated pressure from 1 up to 30 could readily be obtained by due regulation of the apparatus and materials. As the deadly nature of the gas (which causes closure of the glottis or attempted inhalation) requires a provision for its neutralization in its escape from the engine, Dr. Gwynne has met this by passing the escape pipe into a tank of lime water.

Such, in brief, is an outline of a plan which well deserves attention. Sooner or later some substitute for steam must be found, and he is a public benefactor who labors to that end.

Sir J. G. W. Alleyne, of the Butterley Iron Works, has patented some

IMPROVEMENTS IN PUDDLING APPARATUS,

which are well spoken of. The invention relates to puddling furnaces of the kind having a rotating bottom of basin form, and to rabbles to be used in connection therewith. The basin is formed with a double bottom, and supported on a tubular shaft. A pipe extends up this shaft conveying water to jets in the space between the two bottoms, which jets play on the under surface of the upper bottom to keep it cool, the water flowing down the tubular shaft to an outlet at the bottom. The rabble consists of a stem, with a number of tines projecting down from it into the fused metal in the basin. The rabble has either a reciprocating or a rotatory motion imparted to it for more effectually stirring the fused metal.

We learn from *La Metallurgie* that the United States government has paid $10,000 for the right to use

GARNANT AND SIEGFIELD'S PROCESS OF TEMPERING STEEL,

which is described as follows: This steel, heated to a cherry red, is sprinkled with sea salt and worked in this state until it has assumed nearly the form required, the chloride of sodium being renewed from time to time. For the latter is afterward substituted a mixture of equal parts of chloride of sodium, sulphate of copper, sal-ammoniac, carbonate of soda and a half part of saltpetre. The steel is again heated, and the hammering is continued until the steel becomes refined throughout its whole substance, and assumes the desired shape. It is then again brought slowly to a cherry red heat, and plunged into a bath 3·7 litres (3¼ quarts) of rain water, 42·4 grammes (1·484 oz.) of alum, the same quantity of carbonate of soda and sulphate of copper, 28·3 grammes (1 oz.) of saltpetre, and 169·8 grammes (5·843 oz.) of chloride of sodium.

Nature, in an inquiry into the

CAUSES OF MINE EXPLOSIONS,

describes a series of experiments which have been conducted with the view of ascertaining whether, when once an explosion, either of gunpowder or of fire damp, takes place in a mine, and large bodies of air are driven through the passages with great velocity, explosive accumulations will be disloged from cavities, and pressed through the safety lamps with force requisite to pass the flame. The principal experiment was made on part of a new sewer in North Woodside Road, Glasgow. The sewer is ovoid in section; it is six feet high, and four feet wide at its greatest dimensions; part of it is a tunnel in the solid rock, part is built in brickwork, through surface drift. The gas safety lamp or the smaller apparatus was placed on a board fixed across the sewer at a hight of 2 feet 8 inches from the bottom, and surrounded with an explosive mixture of coal gas and air in the same way as when it was used in connection with the tin plate tubes. Shots were fired from a pistol at certain distances from the lamp. One hundred and nine feet was the greatest distance available in the part built of brick, and at this point a sound wave of sufficient intensity to pass the flame was produced by firing a charge of 3·882 grammes = 59 grains of gunpowder. At 96 feet from the lamp a charge of 3·276 grammes was required when the sound wave passed through the brickwork tunnel all the way, and 2·184 grammes when it passed through the tunnel in the solid rock. These experiments seem to be perfectly conclusive. Mr. Galloway's discovery—that when the vibration of the air which constitutes a sound wave has a certain amplitude it can transmit flame through the wire gauze of the Davy and Clanny lamps—furnishes (says *Nature*) an additional argument against retaining these lamps in use, at least in the hands of ordinary workmen. It is certain that in some mines of the present day the ventilation could be doubled or trebeled with advantage; and since this is merely a matter of expense, it may be asked why it is not done, when it would ensure comparative immunity from danger? On the other hand, it is now almost universally admitted to be highly dangerous to continue work in an explosive atmosphere, so that safety lamps should be issued only as a precaution against possible outbursts of gas, or when work is carried on in the neighborhood of gas that can be easily dislodged. It is evident, therefore, *prima facie*, that lamps constructed on the principle of the "safety lantern," such as the Stephenson, Museler, &c., which are extinguished in an explosive mixture, are far safer than lamps like the Davy or Clanny, which continue to burn under the same circumstances, and are then liable, at any instant, to have the flame driven through the wire gauze, and communicated to the external explosive atmosphere.

The Centennial Abroad.

The *Anglo-American* (London) of August 1st says:

General Robert C. Schenck, the American minister in London, has just addressed a letter to Lord Derby, the English Secretary of Foreign Affairs, inviting his attention to the act of Congress, approved June 4, 1874, perfecting and repeating the invitation of the American government to other nations to participate in the Centennial Exhibition at Philadelphia on the 4th of July, 1876. The letter of General Schenck to Lord Derby is in accordance with the instructions of Hon. Hamilton Fish, in America, Secretary of State, printed in the *Anglo-American Times*. Mr. Schenck hardly needed this incentive to move in the important work to which his government is now formally committed. He has been enlisted in it heartily from the first.

Not less active in the same direction is his efficient secretary of legation, Mr. Moran. Indeed, all the Americans in London and on the Continent of Europe are looking forward with increasing interest to the international exhibition at Philadelphia. It is most material, therefore, that the English authorities should regard the invitation by the American Executive with marked favor. America is the only foreign nation that speaks the English tongue. Her laws, her books, her habits, her schools, and, in a large degree, her religion, are founded upon English traditions and examples. She is among the best customers of England, if not the very best. Even in England the great British statesmen and writers are not more honored than they are in America.

No Englishman of distinction visits the United States without a hearty welcome; and when Dickens, Thackeray, Froude, Tyndall, Kingsley, read or spoke to the people of America, they were greeted with a substantial friendship unequaled in their own country. To visit the great Republic is becoming as much the fashion as, a few years ago, it was the exception. We do not doubt, therefore, that Lord Derby's reply will be cordial and sincere. The Centennial celebration at Philadelphia comes at the exact moment for auspicious action and co-operation. All causes of dispute are settled or dead, and every inducement to friendship and intercourse is revived.

As a commercial or a political question the Centennial Exhibition at Philadelphia on the 4th of July, 1876, is of grave importance to England. It will operate with a force stronger than treaties. It will open new markets to other nations, and especially to England. It will prove to America that England is her natural ally in all that relates to regulated liberty. It will prove to England that America has no possible or contingent interest save in peaceful relations to the great leader in the mission of human civilization. To give our readers some idea of the character of the Centennial Exhibition at Philadelphia, it is only necessary to state that that single city, and the State of Pennsylvania, of which she is the metropolis, have already subscribed over a million of pounds sterling to the buildings for the reception of the contributions and the accommodation of the visitors, and this sum will be almost doubled by voluntary contributions from other States and cities.

The plans for these buildings and the approaches to the magnificent park in which they are to be established are a vast expanse larger than any of the great parks of Europe, covering a space of 2800 acres. These plans have been made by the best minds of both countries. Those which have been accepted by the Centennial Commisioners, after a long and careful deliberation, are believed to be unusually perfect. The contractors who are to do all the work according to those plans are of proved experience and responsibility. They commenced operations on the Fourth of July of this year, and are pushing forward with genuine American energy and dash.

Those who recollect the prodigious achievement in the construction of the Union and Central Pacific Railroad, nearly 2000 miles across a continent, half of it a desert, in the midst of and at the close of an exhausting civil war—those who recall the rebuilding of Chicago, in a style of unrivaled splendor, one year after it had been nearly half destroyed by a great fire—and those who are even now reading the wonderful story of the iron bridge across the Mississippi at St. Louis, Missouri, worth about two millions of pounds sterling—need not be convinced that the work on the Centennial Exposition will be finished, and well finished, in time. Philadelphia is a city of over 800,000 souls, and her annual manufactures, as proved by the census of 1870, amount to four hundred and forty-seven millions of dollars, nearly £100,000,000 sterling.

From this it will be seen that she has yet the capacity to finish what she has begun, even if she were not backed by other States and nine Territories, and by the formal endorsement of the United States government. We do not conceal from our readers that there have been many difficulties in the way of this American exhibition. But there were difficulties in the way of our great London Exhibition of 1851, as there were in the way of France in 1867, and Vienna in 1873. These international events are too large not to excite envy and disputes. America will profit by the mistakes and the victories of her transatlantic predecessors.

She cannot hope, and does not aspire even to equal them in art or science; but she does earnestly entreat them to send to her exposition at Philadelphia such trophies of the genius of the Old World as may excite a compensating rivalry in the New World. On her part she will present the proofs of the progress in the century which closes on the 4th of July, 1876. These proofs will fix and confirm the international character of the exhibition, and the contributions of England to America will present a contrast with the products of the latter, not less significant because America is the offspring of British enterprise, invention, law and literature.

The Commercial Relations of the United States with Foreign Countries.

The annual report on the commercial relations between the United States and foreign nations for the year ending Sept. 30, 1873, has just been issued from the Government Printing Office. It is a volume of 1250 pages. The papers transmitted consist of: 1st. A series of tabular statements relating to the commerce of foreign countries from statistical publications of foreign governments received during the past year. 2d. Ten communications from diplomatic officers. 3d. 176 reports carefully revised in the Department of State from consular officers of all grades. It appears from the report that the statement of British commerce for the year 1872, the latest annual exhibit in possession of the Department, gives the aggregate value of the imports from foreign countries into the United Kingdom for the year stated as exceeding £275,000,000 sterling, and of exports as nearly £249,000,000 sterling, these amounts being in excess of the imports and exports of any previous year, and showing an increase over the year 1871 of more than £17,000,000 in the imports, and more than £20,000,000 in the exports. The value of exports to the United States amounted in 1872 to nearly £46,000,000, a greater amount than has been exported to this country in any previous year, while the imports from the United States, amounting to more than £54,500,000, indicate a decrease of nearly £6,500,000 from the year 1871. It appears from the official statistical tables of former years that the value of imports into the British isles from the United States has increased nearly 25 per cent. during the five years ending with 1872, and that the exports to the United States have almost doubled during the same period. The total number of vessels that entered the ports of the United Kingdom from foreign countries and the colonies during the year 1872 was 64,728, a slight diminution from the entries of the previous year. Of this number nearly half carried the British flag. [The tonnage of British vessels exceeded double the tonnage of foreign vessels]. The number arriving from the United States, during the same year was 2726. Of these vessels 480 carried the flag of the United States, being a decrease of over 41 per cent. from the number of American vessels that entered in 1871.

A report from the consul general in London indicates that the exportation from that port to the United States for the year ending Sept. 30, 1873, was £1,099,911, or 12½ per centum less in value than that of the preceding year. The total value of the imports entered for consumption into the Dominion of Canada for the fiscal year ending June, 1872, amounted to $107,709,116, being an increase of $20,761,634, or nearly 24 per centum over the imports of the previous year. The exports for the same period amounted to $82,639,663, being an increase over the year 1871 of $8,466,045, or nearly 11⅛ per centum. The imports into Canada from the United States entered for home consumption amounted during the above period to $54,217,969, being an increase over 1870 and 1871 of $5,195,582. The exports to the United States for the same period amounted to $31,896,816, $921,174 more than the previous year. While during the year ending June 30, 1871, the exports from Canada to the United States exceeded the imports from this country by $1,953,255. During the corresponding period of 1871 and 1872 the reverse was the case by $2,321,153.

The consul at Marseilles has furnished statements of the imports and exports of France for the first eight months of 1873, in advance of the annual official report. Those statements promise an increase for the past year of over $130,000,000, as compared with the imports and exports of 1870. The aggregate value of the declared exports to the United States from the consular districts of this government in France, is reported as amounting to $69,077,562 in 1872. This is an increase of $13,752,888 over the year 1871. The declared value of the exports to the United States from the consular districts of this government in Germany for the year 1872, is estimated at $37,177,000, this amount exceeding that for 1871 by more than $4,000,000.

The political disturbances in Spain do not appear to have produced a decline in the commerce of that Republic. Indeed, the official statement shows an increase of more than $40,000,000 in the value of the imports for the first six months of 1873 as compared with the imports for the corresponding period of 1872. The minister at Madrid reports that he belives the returns of the exports will afford even a more favorable exhibit.

During the five years ending with 1872, the commerce between the United States and Switzerland has doubled. The value of watches exported to this country in 1872 is reported as as having amounted to $3,600,000.

The direct import and export trade of China with the United States appears to be very small, but the American inland and coast trade is reported to exceed that of any other nation. The entire American trade, foreign and coasting, forms nearly 37 per centum of the whole foreign trade of China, and contributes more than 23½ per centum of the revenue collected by the Foreign Customs Department.

In Japan the progress of civilization has continued. The formal opening of the railway from Yokohama to Yedo and the completion of telegraph lines are announced. A great improvement has been effected in the lighthouses on the Japanese coast, the system there adopted being reported as of great excellence and of much benefit to navigators. The accounts of the commerce of Japan during the year 1873 are unfavorable. The returns from that country exhibit a decrease in the exports of nearly 40 per cent from the preceding year, and heavy losses are reported to have been suffered by merchants.

With two exceptions no statistics of the aggregate commerce of any of the Spanish American States have been received.

A Correspondent writing from Beaver Falls, Pa., says: There are now one hundred and forty Chinamen in the town, and but one woman in the party. They conduct themselves well, attend to their own business, and are unobjectionable to the mass of the citizens. They are all employed, in the cutlery works, and some of them are beginning to express a desire for lighter work—although an Irish or German laborer would regard their work as mere play. They are physically weak and will never be able to supplant American workmen in those avocations requiring muscular strength as well as skill. If they are to run our rolling mills and machine shops, quarry our stone and mine our coal, lay brick, cut stone and shove the saw and the plane, they will have to learn to put away under their smocks a good deal more rice and rat than they are in the habit of doing.

Lubricating Oils.

Few persons, when contemplating a beautiful and elaborate piece of machinery, are inclined to reflect that the efficiency of the machine is dependent on the presence of a non-metallic and almost invisible agent. Everything, perhaps, is noticed, except one thing, although on that depends the safety and efficiency of the whole contrivance. There is scarcely a machine in existence of any size and complexity which would not be torn to pieces in a few minutes if set to work without some means being adopted to reduce the friction of its parts. The reduction of friction is not only necessary to the saving of power, but to the actual endurance of the machine. Hence the importance of providing proper means of lubrication, so that the moving surfaces, otherwise in contact with each other, shall not produce mutual destruction.

One of the first effects of friction is to engender heat. It is a singular circumstance that whereas lubricants are intended to prevent friction, many of them are capable, under certain circumstances, of exciting a degree of heat which is fraught with danger. This action takes place, not when the lubricants are in contact with metallic surfaces, but when they are absorbed into certain fibrous or cellular bodies of a vegetable nature. Wood, in the form of sawdust, when impregnated to a moderate extent with one or other of a certain class of oils, is capable of developing spontaneous combustion. The action is still more rapid when the material consists of cotton rags to which the dangerous class of oil has been applied. The phenomenon is evidently one of oxidation, for in the case of sawdust, if the saturation be very complete, combustion does not take place, whereas if the soaking be slight, there is a probability that combustion will ensue.

A combination of various qualities is necessary to constitute a thoroughly good lubricant. Of course, there ought to be no corrosive action. The simple duty of the agent is to keep the moving surfaces from coming in contact. There is also the question of cost. All other things being equal, the cheapest oil commands the preference. But a seemingly cheap oil may have very little else to recommend it; and, on the other hand, a high priced oil may not possess the pre-eminence in quality. In order to attain cheapness, there have been many attempts to mix oil, which have only resulted in producing a low-priced but practically dear article. Olive oil ranks high as a lubricant; but it is dangerous from its liability to cause spontaneous combustion among cotton waste, although an idea has long prevailed to the contrary. For some years past an oil has been growing into favor, which is free from the chance of setting up spontaneous combustion, and is at the same time an admirable lubricant, beside possessing the advantage of a moderate price. This is the oil referred to by Mr. Baxter, at the time he was secretary to the Admiralty, when that gentleman stated in the House of Commons that "a vastly superior article (in contrast with Gallipoli oil at £72 per ton) was obtained at £40 or £45 per ton." This article is that known as "patent Rangoon engine oil." The Admiralty have been acquainted with this oil for a good many years, and were by no means hasty in adopting it. But so thoroughly has it commended itself to approval under a test of actual experience, and as applied to all kinds of machinery, that it is now used almost exclusively in her Majesty's dockyards and the fleet. It is also extensively adopted by the War Office and by the government of India. The Royal Mail Steam Packet Company have used this oil for fourteen years, and so perfectly uniform is its quality that they have never made a complaint concerning it during the whole of that period. Its adoption is also extended to the Pacific Steam Navigation Company, the Peninsular and Oriental Company, the Cunard Company, and most of the other mail packet fleets appertaining to the United Kingdom. Hence there is abundant testimony to the practical value of this oil.

The test, with regard to spontaneous combustion, is one which ought on no account to be overlooked. It has no relation to what is termed the "flashing point" of an oil. Scientific investigations seems to show that oils which have a vicid character are those which possesses, in varying degrees, the dangerous property of setting up a high degree of heat under certain circumstances. So far as the flashing point is concerned, the most volatile of natural lubricating oils will not give off an inflammable vapor at a lower temperature than 200° of Fahrenheit. Consequently the vapor cannot come into play until danger presents itself from some other source. As for the risk of spontaneous combustion, the following test has been applied: Cotton waste, soaked in Rangoon engine oil, was enclosed in a metallic vessel surrounded by an air bath having a temperature of 170°. In six hours and a half, the temperature of the oiled cotton had not risen to above 144°. The gas flame which heated the air bath was allowed to remain under the vessel for a further period of seventeen hours, but no change was produced, except that there was discernible a slight smell, due to the evolution of acrid vapor, in small quantity, arising from the slow decomposition of the vegetable part of the oil. The bath was next raised to 190°, and so remained for twenty-four hours; but no effect was produced. The temperature of the bath was next raised to 200°, and left at that point for six hours, but the material still remained perfectly quiescent, showing its utter incapability of producing spontaneous combustion.

In contrast with the foregoing, we may mention that cotton soaked with olive oil (Gallipoli, on being exposed to a temperature of 170° for a day and a night, was found, on examination in the morning, to be much charred, the center portion being reduced to ashes, showing that actual ignition had taken place. In a series of experiments conducted by Mr. John Galletly, a quantity of cotton waste was soaked in Gallipoli olive oil, and loosely packed in a paper box, in size about the sixteenth part of a cubic foot. The box was exposed to a temperature of 139° Two trials were made under similar circumstances. In the first, rapid combustion was found to be coming on in little more than five hours, and in the second within six hours. Remarking on these and similar experiments with other oils (exclusive of the hydrocarbons), Major V. D. Majendie, R. A., Her Majesty's Inspector of Gunpowder Works, observes: "These facts illustrate the grave and urgent character of the risk which exists when oiled cotton waste is deposited, even in very small quantities, and for a very short space of time, in moderately elevated temperatures—such temperature as exists in the majority of factories, in the neighborhood of a steam pipe, or under exposure to the sun's rays."

There is reason to believe that a large number of fires, exceedingly destructive to property, are due to spontaneous combustion, originating in the use of certain oils for lubricating and other purposes. Even in the case of coal mines, there is danger from the same source. Oily rags may burst into a blaze when nobody is at hand to check the incipient flame, and if inflammable gas be present an explosion may occur of which no one will be able to give an account. As a general rule, any oily or greasy matter which is capable of turning rancid, as even so seemingly safe a substance as butter itself, is liable, when occupying the pores of certain substances, to set up a degree of heat leading to positive combustion. When the article saturated consists of silk instead of cotton, the heating process seems to be quite as rapid, if not more so, although the material does not exhibit flame, owing to the want of inflammability in the silk. Major Majendie, remarking on Mr. Galletly's experiments in this direction, says that "silk waste is at least as dangerous as cotton, or even more so, in a building containing gunpowder or other material which is capable of being ignited or exploded without the actual application of flame."

The value of an oil which not only possesses superior qualities as a lubricant, but which is free from all risk of setting up spontaneous combustion, is rendered evident by the facts and considerations thus advanced. If the oil were costly, it would yet deserve acceptance; but as it is cheap, there is every encouragement to its use. We believe the whole question of spontaneous combustion is one which calls for more attention than it has received, and that it is very much misunderstood where it ought to be clearly apprehended. Apart from this question, a cheap and good lubricant possesses no little importance, as enabling every machine to do its proper work.—*Iron.*

The Steel Works of the Lackawanna Iron and Coal Co.

The foundations for this important establishment were commenced in the vicinity of the company's rolling mills on the 16th of June last, and the work of construction is being rapidly carried on. It is expected to have the walls ready for the roof on or about the first of December next. The capacity of the works will be extensive, consisting of a cupola room 44 feet span, 71 feet long, and 49 feet high to eaves; a converting room, 84 feet span, 124 feet long, and 31 feet high; an engine room, 54 feet span, 77 feet long, and 16 feet high; a boiler room, 46 ft. span, 73 ft. long, and 16 ft. high to eaves. All these buildings will be arranged so as to form a rectangle of 124x202 feet.

In the cupola room will be located four cupolas of seven and a half feet in diameter, four feet in depth of tuyeres, and fifteen feet high to charging doors, each capable of smelting five tons in thirty minutes; also two six ton ladles mounted on scales for receiving the molten pig iron from the cupolas, and in which it will be weighed before converted into steel; also two reverberatory furnaces for smelting the franklinite, the office of which is to impart to the converted product its requisite hardness as well as to remove impurities. In each end of the cupola room will be a hoisting tower furnished with a hydraulic elevator of six tons capacity and fifty feet travel.

Two five-ton converters will be located in the converting room, of eight feet external diameter and fifteen feet high. These will be lined with refractory material ten inches thick at the bottom of the vessel, and will be provided with stout trunnions eighteen inches in diameter, and with hydraulic gear for rotating, mounted on iron beams and columns. The center of the converters will be ten feet nine inches above general level. These are, by means of the hydraulic rotating gear, first put in a nearly horizontal position, for receiving the molten pig iron, next in an upright position while the iron is being converted, and lastly in a reversed position, while discharging the yet hissing steel. Immediately in front of the converters will be situated the casting pit, which will be 38 feet in diameter, and two and a half feet deep, and commanded by a central hydraulic ladle-crane of twelve tons capacity. At its extreme end is mounted a ladle, which receives the steel from the converters. This ladle-crane will then be swung over the several ingot molds in rotation, when the liquid metal will be tapped from the bottom of the casting ladle, to avoid the slag becoming mixed with the steel. The steel ingot will then be allowed to solidify, after which it will be weighed and stamped with the number of the charge and its degree of hardness, and is then ready for blooming and rolling into rails. The size of the ingot depends on the weight of the rail to be produced. It will average twelve inches square and forty-five inches long, and for two thirty foot rails sixty-five pounds per yard.

In the converting room four more hydraulic cranes will be located about the casting pit and the converters, for manipulating the ingots, molds, ladles, and other accessories.

The lining at the bottom of the converters suffers most, of course, during the conversion, and to provide for this unequal wear there will be twelve reserve bottoms, by means of which the process may go on uninterruptedly. Thirty heats of five tons each, or about 150 tons, can be turned out every twenty-four hours. These bottoms are prepared in the establishment, being first rammed up with refractory material in a semi-plastic state, and then exposed to a slow and steady heat in large ovens, of which there will be five, each 8 feet wide, 8 feet high, and 16 feet long in clear, and all opening into the converting room. All the hydraulic machinery will be actuated by a hydraulic duplex force pump, having two steam cylinders 30 inches in diameter, two water cylinders of 9 inches in diameter and 24 inches stroke. A somewhat smaller pump will be provided also in case of accident.

The water will be forced from these pumps under a pressure of 300 pounds per square inch to a system of pipes which will communicate with the various hydraulic motors throughout the works. First, however, it will pass through a regulating apparatus, where each pipe will be provided with a balance valve, a slight motion of which regulates or arrests the powerful current, which, when liberated, will be capable of raising twelve tons with a speed of one foot per second. These pumps will be located in the engine room, where will also be two independent horizontal and condensing blowing engines, fifty inches in diameter and blowing cylinder fifty-four inches in diameter and five feet stroke.

These engines will furnish the blast requisite for the conversion to the converters at the rate of 9500 cubic feet per minute, and under a pressure of twenty pounds per square inch.

The boiler house will be occupied by a battery of six boilers of the locomotive type. Each boiler will have 34 square feet grate surface, 1504 square feet heating surface, and 112 tubes sixteen feet long and three inches in diameter. —*Scranton Republican.*

Special Notices.

Wanted.

A situation as superintendent of a rolling mill, by a man who has a practical knowledge of Merchant, Guide and Hoop Rolling, also of puddling. Understands Rail Turning, Mill Building and Repairing. Good reference given. Address

ALFRED COE,
219 Northampton St., Easton, Pa.

Wanted.---Situation.

A young man, 21 years of age, desires a situation in the Hardware Business. Has had five years' experience in general hardware, and can give the best of references as to character and capacity. Address
DUDLEY W. SMITH, Wooster, O.

NOTICE.

I will sell at auction and private sale the entire stock of Hardware belonging to John S. Prouty, in lots to suit customers.

Auction days Tuesdays and Thursdays, and all other times at private sale (quoting auction prices) until the whole is disposed of. Terms liberal.

JNO. H. WILLIAMS.

Wanted,

By a New Orleans Hardware House, a young man as Traveling Salesman. Must understand the business and come well recommended. Address, giving particulars, *P. O. Box 2532, N. Y. City.*

Wanted.

A situation of responsibility by a gentleman of thorough business education. Has been connected with iron and mining interests in the highest capacity as constructing engineer and manager. Has best of references. Manufacturing interests of any kind, present or prospective, preferred. Is not afraid of work. An inferior position will be taken. Salary nominal. Address S. E. C.,
Office of *The Iron Age*, 10 Warren St., N. Y.

Blast Furnaces.

WANTED.—A situation by a competent, experienced Furnace Manager, either in locating or erecting furnaces, or taking full charge of those already erected. Has had experience in coke and anthracite coal. Has planned and erected the largest class of works and put them in successful operation. Has best references. Salary in accordance with the times. Address X. L.,
Office of *THE IRON AGE*, 10 Warren St., N. Y.

A GENTLEMAN OF TWELVE YEARS' EXperience in the Wholesale Metal Trade of New York, desires a position in a Western House as Store or Traveling Salesman. Traveled West and South for nine years. Address J. E. H.,
Office of *The Iron Age*, 10 Warren St., N. Y.

Wanted,

By an Analytical Chemist of some experience, (has had charge of the Laboratories of Lafayette College for several years) a situation in Metallurgical or Chemical works. Good references.
CHARLES McINTIRE, Jr.,
1136 Washington St., Easton, Pa.

Hardware and Cutlery Buyers,
TAKE NOTICE.

Hardware Trade Sale.

BISSELL & CO., Auctioneers.
Successors to R. T. Hazell & Co.,
Will sell at
Auction on Tuesday & Wednesday,
August 25 & 26,
AT THEIR SALESROOMS,
No. 94 Reade Street, N. Y.,
A LARGE ASSORTMENT OF
HARDWARE, CUTLERY, GUNS, &c.,

Embracing about 2000 lots, including large invoices of English and American *Table Cutlery*, English and German *Pocket Cutlery, Scissors, Shears, Razors,* English and American *Files, Axes* and *Hatchets, Hand, Panel* and *Wood Saws, Wrought Goods* and *Butts, Shovels, Guns, Pistols, Tea Trays, Silver Plated Ware.* Two thousand pieces *French Tinned Ware, Tinned Spoons, Coal Scuttles,* &c., &c, being an assortment of goods suited to all sections, and will be sold in lots to suit city and country trade. Out-of-town buyers can have their goods packed and shipped from store. Catalogues will be ready early morning of sale.

Wanted.

A situation as bookkeeper or cashier of an iron works, a hardware business, or in the coal trade, which the advertiser understands in all its branches. Highest references of character, capacity, &c.
Address, H. D.,
Office of *The Iron Age*, 10 Warren St., N. Y.

Special Notices.

WM. E. TANNER & CO.,
Metropolitan Works.
Manufacturers of
Steam Engines, Boilers and other MACHINERY,
Canal St., from 6th to 7th, Richmond, Va.

In addition to a full line of new engines, boilers, saw mills, and other machinery of our own manufacture, we have now on hand and will sell at very moderate rates, the following lot of **second-hand machinery,** viz.: 3 Double Hoisting Engines, suitable for mining, tunnelling or other purposes. Each of these engines has two cylinders, 7½ in. diam. by 18 in. stroke; two drums, 4 ft. diam. by 4 ft. long; geared to engine in proportion of 8 to 1, and are provided with disconnecting gear and friction brakes.

One 150 Horse-Power Stationary Engine, with heavy fly wheel, all complete, and nearly as good as new.

Three Return Tubular Boilers, (70 three inch tubes each), 15 feet long, complete with steam drum, fronts, valves, grates, &c., suitable for the above engine.

One 10 Horse-Power Portable Engine of our own make, complete, with two driving pulleys, "Judson" governor, &c., nearly new, and in excellent order.

One 30 Horse-Power Portable Engine, with circular saw mill, saw and belt complete, in first rate order.

Three 4 Horse-Power Stationary Engines. Cylinder, 4 in. by 10 in.

One 30 Horse-Power Stationary Engine, as good as new, complete, with "Judson" governor, fly wheel, &c.

One 30 Horse-Power Stationary Engine, in good running order, but not as new as the above.

One 16 Horse-Power Stationary Engine, with new vertical boiler.

One Otis Hoisting Engine, in good order.

Two Flue Boilers, 26 ft. long, 42 in. diam., each with two 14 in. flues, iron front, grates, &c., in good order.

One Flue Boiler, 34 ft. long, 48 in. diam. with two 14 in. flues, about as good as new.

One 7 Horse Portable Engine, of our own make, used only a few months, and in perfect order.

Two No. 6 Sturtevant Blowers. Two No. 4 McKenzie Blowers. One No. 6 Andrew's Centrifugal Pump. One No. 6 Turbinate Centrifugal Pump. Three No. 0 Cameron Pumps. One No. 2 Cameron Pump. One Knowle's Pump. One Earle Pump.

Thirty Brass Tubes, 1¼ diam., 12½ ft. long.

Send for illustrated catalogue and Price Lists.

Wanted,

By a gentleman a position as saleman in the steel, iron or metal trade. Has been several years engaged with a house in the metal and iron trade, and has a large connection in this city. Refers to late employers.
Address, IRON.,
Office of **The Iron Age,** 10 Warren St., N. Y.

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Capital - - $6,000,000, Gold.
Surplus - $1,800,000, Gold.

The New York Agency, No. 50 Wall Street, buys and sells Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

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Katahdin Charcoal Pig Iron.

O. W. DAVIS, Jr., Manufacturer, Portland, Me.

Furnace in Piscataquis County, Me., for Car Wheels, Steam Cylinders, Boiler Plates, Hydraulic Presses, Plows, Chilled Rolls, and any purpose requiring great strength.

South Boston Tests, Katahdin Pig Iron.

No. 2,	density, 7·202;	tensile strength	per square in.,		19,894
No. 3,	" 7·242;	"	"	"	26,928
No. 4,	" 7·295;	"	"	"	30,765

Shipped by rail or water from Bangor or Portland. Samples and analyses furnished on application.

THE
McHaffie Direct Steel Castings Co.
STEEL CASTINGS,

Solid and Homogeneous, guaranteed to stand a Tensible Strain of 25 tons per square inch. An invaluable substitute for expensive **WROUGHT IRON FORGINGS** or for Iron Castings, where great strength is required. Office, cor. Chestnut and Levant Sts., PHILADELPHIA.
Send for Circular and Price List.

$30,000 to $50,000.

WANTED.—Additional capital in an Iron Furnace Company, now in operation and making Pig Metal at a profit of $8 to $10 per ton at present prices. A party who would take the active management of the business preferred; or the interest could be divided in $5000 to $10,000 shares. Present capacity of furnace, about 70 tons per week. With small expense the production can be doubled. Address,
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ASA SNYDER,
Scotch and Anthracite Pig Irons.

Also Furnace Agent and Dealer in the following brands of
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Office and Yard,
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Patents secured in the United States and Europe, on the lowest terms and very
PROMPTLY,
by A. V. BRIESEN, Solicitor of Patents and Attorney at Law in Patent Cases.
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Consultation gratis.

The Chilian Exposition.

Packages for this exposition can be shipped at the Pacific Mail Steamship Co.'s office, foot of Canal Street, New York, and from the Pacific ports touched at by the steamers of this company. One dollar, gold, for each package weighing not more than 2000 pounds or measuring not more than 20 cubic feet, is the only cost of ocean transportation to Chili. Heavier or larger packages may be shipped per same line at low rates under special contract. Applications for room at the Exposition must reach Chili by January 1st, 1875. Particulars may be obtained by addressing any one of the United States Commissioners for the Exposition, any Chilian Consul in the United States, or
A. VILLARROEL, Corresponding Agent,
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Successors to R. T. HAZELL & Co.,
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CASH ADVANCES made on CONSIGNMENTS without additional charge.

To Quit Business.

Will sell the best appointed Hardware Store Building in the State of Ohio, with or without stock. Doing a very large and satisfactory trade. No bonus for the trade. Parties purchasing will have a good and satisfactory business from the opening. Property rents at good prices.

For particulars inquire of
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JAMES C. JACOBS, Wooster, Ohio.

Special Notices.

THE
Fletcherville Blast Furnace Co.,
Manufacture
CHARCOAL PIG IRON,

Exclusively from New Bed Pure Magnetic Ore, suitable for Bessemer, Malleable and Car Wheel purposes, or for foundry use where very soft and strong iron is required.

Analysis of Average New Bed Pure Ore.		*Analysis of No. 1 Bessemer Pig.*	
Metallic iron	68·240	Undetermined matter and loss	·134
Oxygen with iron	26·010	Silicon	1·019
Water	·380	Carbon	3·821
Insoluble silicous matter	4·320	Phosphorus	·048
Sulphur, practically none		Sulphur, practically none	
Phosphorus	·038	Calcium	·140
Alumina	·280	Metallic iron	94·838
Lime	·140		100·000
Undetermined matter and loss	·592		
	100·000		

Witherbees & Fletcher,
Port Henry, Essex Co., N. Y.
Furnace at FLETCHERVILLE, near Mineville, N. Y.

Rivet Machine Wanted.

Wanted a first-class Machine to make Boiler Rivets. Address, with price and full description,
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TO INVENTORS AND MANUFACTURERS

The Managers of the 43d Exhibition of the American Institute, of the City of New York, beg to announce, that the Exhibition Buildings on 3d and 5d Avenues and 63d and 64th Streets, will be open for the reception of heavy Machinery August 17th and for other articles, August 31st, 1874. The Exhibition will be formally opened September 9th.

For particulars, address "General Superintendent, American Institute, New York."

A. PURVES & SON,
Corner South & Penn Streets, Phila.,
Dealers in
Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys, Steam Engines, Pumps & Boilers, Copper, Brass, Tin, Babbit Metals, Foundry Facings. Best Quality Ingot Brass.
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desirous of introducing their goods to the **British** and **Continental** Markets, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at *99 Cannon Street, London, E. C.*

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J. M. WHITE,
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At Lowest Manufacturers' Rates.
GUNS & SHEET ZINC,
Best German and Belgian Brands,
By *LOUIS WINDMULLER & ROELKER,*
20 Reade Street, N. Y.

FOR SALE,

£1. German consular instructions in English, published by subscriber, who *translates* from and into the English, Spanish, French and German. Latest *translations* made for the Spanish Government, Pacific Mail Steamship Co., Walter A. Wood, Morris, Wheeler & Co., Todd & Rafferty, and John T. Dunkin, N. Y.; Wilder & Co., Savannah; and the Tanite Co., Stroudsburg; by
C. KIRCHHOFF,
Commercial Editor "El Cronista,"
Box 2806, N. Y.

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Manufactured by the
ULSTER BLAST FURNACE,
NAPANOCH, N. Y.
Samples and prices with,
M. M. PILLSBURY, 85 John St., N. Y.

Valuable Iron Works For Sale.

The undersigned offers for sale the Iron Works in Pottsville, Schuylkill County, Pa., known as "The Washington Works," consisting of a

Large Stone Machine Shop & Foundry,
Brick Pattern House, Erecting Shop, Stone Blacksmith Shop, Brick Office, and Lot of Ground containing in front 195 feet 3 inches, and in depth 260 feet.

There will be sold with the above a large and valuable collection of Patterns, Heavy Crane Flask and Heavy Core Spindles for making heavy Castings and Pipes of all sizes; Turning and Planing Tools.

The Works can be put in immediate operation. A favorable opportunity is here presented for enterprising men. The demand for Castings and Machinery is constantly increasing in this region. The property will be sold on liberal terms. *If not sold in a reasonable time it will be for Rent.*

For particulars apply to
J. W. ROSEBERRY, Trustee,
Pottsville, Pa.

FOR SALE.

A well appointed **Hardware, Stove** and **Tin** establishment situated in a thriving village of Western New York. Satisfactory reasons given for wishing to sell. I will make it an object for a young man with a small capital to purchase.
Address, *HARDWARE,*
Office of The Iron Age, 10 Warren St., N. Y.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Aug. 19, 1874.

The past week has been notable for nothing, in Wall street, but unparalleled dullness. The money market continues very easy, with call loans easily had at 2 @ 3 per cent. Prime commercial paper is fairly quotable at 5 @ 7 per cent.

Gold has been very steady throughout, and the extreme fluctuations have been only four points apart. The following shows the highest and lowest daily quotations:

	Highest.	Lowest.
Thursday	109¾	109½
Friday	109¾	109½
Saturday	109¾	109¼
Monday	109¾	109¼
Tuesday	109¾	109¼
Wednesday	109¾	109¼

Government bonds are dull, but firm; State bonds steady, and railway mortgages strong.

The stock market has been strong and somewhat buoyant, with advancing prices. The principal dealings have been in Union Pacific, Lake Shore, Pacific Mail, Western Union, St. Paul and Ohio.

The bank statement shows an important decrease in specie, resulting from coin shipments to Europe. There is also a decrease in deposits, and a reduction of $1,284,000 in loans. The total reserve is down $3,359,400. The total reserve required under the new law is $59,478,875, and the banks hold $88,920,100, or $29,451,225 more than the legal requirement. They so held last week $31,724,100, so that there has been a decrease of $2,272,875. The following is a comparison of the averages for the past two weeks:

	Aug. 8.	Aug. 15.	Differences.
Loans	$280,534,300	$279,250,200	Dec. $4,284,100
Specie	25,740,000	22,352,000	Dec. 3,388,000
Leg. Ten	66,549,530	66,578,100	Inc. 28,600
Deposits	241,251,630	237,915,500	Dec. 4,346,100
Circulation	25,805,700	25,809,100	Inc. 3,400

For the information of such of our readers as are interested in the subject, we will here explain the character of the reserve requirements under the old and new laws. Under the old law, what have been known as "the country banks" (constituting nine-tenths in number of all the existing national banks) were required to hold 15 per cent. reserve against circulation and deposits alike, of which 40 per cent. had to be kept in the form of either legal tenders, legal tender certificates, or specie, in their own vaults, while 60 per cent. could be held as deposits with their redemption agents; under the new law, this class of banks are required to hold 15 per cent. against deposits only, distributed as before, viz., 40 per cent. necessarily in their vaults, and the remainder at their option on deposit with other banks or in their own hands; while they are also required to deposit with the United States Treasurer an amount of legal tenders equal to 5 per cent. of their circulating notes. A second class of banks, located in fourteen "redemption cities," and now numbering 178, were required, under the old law, to hold 25 per cent. against both deposits and circulation, one-half of which must be in their own hands, and the remainder might be deposited with redemption agents; under the new state of things, these banks have to keep 25 per cent. against deposits only, one-half in their own hands and the other either in their vaults or on deposit with other banks; these banks also have to deposit with the United States Treasurer legal tenders to the amount of 5 per cent. of their circulation. The third class, consisting of the banks of New York city, were formerly required to have 25 per cent. in specie, legal tenders or legal tender certificates in their vaults against deposits and circulation combined; these banks now need to hold 25 per cent. against deposits only, while they are also required to deposit 5 per cent. of the amount of their notes in lawful money with the United States Treasurer.

The foreign trade movements for the week are shown in the following tables:

IMPORTS.

	1872.	1873.	1874.
Total for week	$10,139,006	$6,970,443	$5,252,836
Prev. reported	269,670,737	252,543,901	253,393,426
Since Jan. 1	$279,809,743	$259,514,343	$258,646,262

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Brass goods	7	$908
Bronzes	19	4,538
Chains and anchors	31	1,576
Copper		161
Cutlery	115	30,513
Guns	72	10,045
Hardware	16	1,842
Iron, pig, tons	600	19,847
Iron, sheet, tons	24	5,261
Iron, other tons	138	737
Lead pigs	1,648	10,897
Metal goods	82	17,430
Nails	2	534
Needles	13	9,113
Old metal		2,969
Plated ware	1	125
Per. caps	2	325
Saddlery	3	322
Steel	570	16,959
Spelter	165,197	8,067
Tin, boxes	9,313	76,436
Tin, 600 slabs	22,629	4,760
Wire	15	698
Zinc	69,615	4,045

EXPORTS EXCLUSIVE OF SPECIE.

	1872.	1873.	1874.
For the week	$4,976,118	$5,258,190	$5,496,733
Prev. reported	133,608,371	174,268,934	181,114,373
Since Jan 1	$138,584,489	$179,527,124	$186,611,106

EXPORTS OF SPECIE.

Total for the week	$2,032,733
Previously reported	36,876,509
Total since January 1, 1874	$38,909,242
Same time in 1873	38,513,581
Same time in 1872	55,238,366

Government bonds closed as follows:

	Bid.	Asked.
U. S. Currency 6's	117½	117¾
U. S. 6s 1881, reg	117⅝	117⅞
U. S. 6s. 1881, cou	118⅛	118⅜
U. S. 1862, 5-20 reg	112	112¼
U. S. 5-20 1862, cou	112	112¼
U. S. 5-20 1864, reg	114⅝	115
U. S. 5-20 1864, cou	115¼	116
U. S. 5-20 1865, reg	115⅝	115¾
U. S. 5-20 1865, cou	117⅛	117¾
U. S. 5-20 1865, reg. new	115⅛	115¾
U. S. 5-20 1865, cou	116⅜	116⅝
U. S. 5-20 1867, reg	116¼	117
U. S. 5-20 1867, cou	117⅝	117¾
U. S. 5-20 1868, reg	116¼	117
U. S. 5-20 1868, cou	117¼	118
U. S. 10-40 reg	110⅜	110½
U. S. 10-40 cou	113¾	114
U. S. 5s of 1881, reg	112¼	112¾
U. S. 5s of 1881, cou	112⅜	112⅝

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	102⅞	102⅛
Lake Shore	73¼	72⅞
Rock Island	101⅛	100½
Del. Lack. and Western	107⅜	107⅛
Wabash	36¼	35⅞
Western Union Telegraph	76⅝	75¾
Northwestern	88¼	88⅛
Do. Preferred	55⅜	55¼
Milwaukee & St. Paul	35⅛	34⅞
Milwaukee & St. Paul Preferred	53¼	53⅛
Pacific Mail	47⅜	46⅞
Erie	32⅝	32⅜
Ohio & Mississippi	24¼	24
Union Pacific	29⅛	29
C. C. & Ind. Central	13⅞	13¼

GENERAL HARDWARE.

Although few of the large buyers who visited this market within the past few weeks, left any orders which realized the expectations of the trade, still many of our city houses show unmistakable signs of activity. In the matter of prices, few changes have transpired since our last, and with the exceptions noticed below, the general tone of the market is firm.

The Russell & Erwin Mfg. Co. have issued, under date of Aug. 15, a condensed price list of their Real Bronze Hardware, which gives the various changes made up to this date, and which were reported by us when made. On Lava Door Knobs, Escutcheons and Shutter Knobs the list has been changed and the discount made 10 per cent., leaving the net prices about the same as before. On all other goods in their list the discount is now 20 per cent., instead of 10 per cent. previously. Two per cent. may be deducted from all bills if paid within 30 days from their date. Their illustrated catalogue of Bronze goods will soon be ready for distribution, and the preparation of their illustrated catalogue of General Hardware is progressing rapidly.

The Hart, Bliven & Mead Mfg. Co. are issuing the following circular:

TO THE TRADE.

Having become interested in the manufacture, we now offer for sale a superior quality of Flint Paper, to be stamped, as our Trade Mark, "H., B. & M. Roman Flint Paper."

Prices per Ream, $4·25	4·25	4·25	4·25	
Nos	0	½	1	1½
Prices per Ream, $4·75	4·75	4·75	4·25	
Nos	2	2½	3	Ass'd.

Discount 15 per cent.

Orders sent to us for "B. & A." Sand Paper will be executed as far as we may have the stock and sizes on hand at the time the orders are received, at 15 and 5 per cent. discount, and the balance of orders filled with our "H., B. & M." brand at 15 per cent., with a full warrantee on our part in regard to quality of the latter.

THE HART, BLIVEN & MEAD MFG. CO.
NEW YORK, August 15, 1874.

The demand for Foreign Hardware does not come up to the general expectations of the trade, and complaints of small orders are frequent. It is difficult to imagine that, with the extreme caution exercised by buyers all over the country during the past year, any considerable accumulation of stocks can have taken place, and the belief gains ground that orders are only postponed until the actual wants of the country render it imperative on the part of dealers to supply themselves. We hear of no changes in prices.

The demand for Nails is improving, and there is a better inquiry for large lots. In the matter of price the situation is unchanged, and we continue the quotations of last week, viz.: 10d. in small lots, $3·75 @ $3·85, net. Large orders are easily placed at $3·70, net, with a few exceptions of special brands, which are firmly held at $3·85 for large or small lots.

The manufacturers of Cordage held a meeting to-day and advanced the price of Sisal Rope half a cent per lb.; Manila and New Zealand Cordage remain as previously quoted. We publish below the revised list, which is subject to the usual trade discount:

Manila Cordage, sizes above 12 th'd	16 cts.
" " 6 th'd and 9 th'd, (¼ in. and 5-16 in. diam)	17 "
Manila Cordage, 12 th'd, (⅜ in. diam)	16½ "
" Hay Rope	16½ "
" Cordage, bolt rope yarns	18 "
" " " " 6 th'd and 9 th'd	19 "
Tar'd Manila	15½ "
Fine Tar'd Manila Lath Yarn	17 "
Sisal Rope, sizes above 12 th'd	13 "
" 6 th'd and 9 th'd	14 "
" 12 th'd and Hay Rope	13½ "
New Zealand Cordage, sizes above 12 th'd	12½ "
" " 6 th'd and 9 th'd (¼ and 5-16 in.)	13½ "
New Zealand Cordage, 12 th'd (⅜ in.) and Hay Rope	13 "

The Brass Manufacturers' Association held a meeting to-day at the Metropolitan Hotel, in this city. Considerable business of importance to the trade was transacted. A new list was adopted which contains some changes in classification. The price of Sheet Brass and Brass and Copper Wire was reduced 8 cents per pound. German Silver Market Metal and Wire were reduced 5 cents per pound, and Brass Scrap was reduced 3 cents per pound. Brass and Copper Tubing were proportionately reduced. The matter of Copper Rivets and Burs being outside of this Association, was not taken under consideration, and these goods are still difficult to quote at anything better than nominal figures. As the meeting was held late in the afternoon, we are only able to give the more important results. We omit our list of these goods until the revised list is published. The discount from the revised list will be the same as formerly.

Rogers & Bro., Waterbury, Conn., and 203 Broadway, New York, have issued a revised price list, illustrating their Silver Plated Spoons, Forks, &c., and giving the lists of a large line of Hollow Ware and other Plated goods, to which they call special attention. They overcome the difficulty of illustrating their large and constantly increasing line of goods in the following novel way:

"We publish no Illustrated Catalogue of our productions; but to our old customers we will send, on application by mail or telegraph, Photographic Albums to order from, containing all the newest designs up to the latest date (unattainable in a printed catalogue). The goods are photographed on a scale, and the prices distinctly marked, so that any dealer may have the advantage of seeing and ordering the latest styles. The selections to be made on receipts of Albums, and the same to be returned to us without delay. Parties unknown to us may procure these Albums on the same terms, by application, enclosing their business card and references."

We quote "Rogers & Bro. A 1" Plated Forks and Spoons at discount 40 and 10 per cent., 4 months, or 40, 10 and 5 per cent., cash, in 30 days, instead of 40 and 5 per cent., cash, as formerly. We invite the attention of the trade to their advertisement on another page.

J. Clark Wilson & Co. have added to their line of specialties a new Can Opener which deserves more than a passing notice. It is styled "The Eureka Can Opener," and was patented June 9th, 1874. It is a simple contrivance, formed with a holder, in which is inserted one stationary and one moveable clamp, with a screw to attach the clamps firmly to the can; the holder is furnished with a handle, which the operator taking in one hand, can hold the can firmly, while with the other hand he operates the cutter, which moves on a swivel, and describes a circle, which is cut through with great ease. "The Eureka Can Opener" is made entirely of iron, has nothing about it liable to get out of order, and is the most effective instrument of the kind which has come to our notice. It is placed on the market at $5·50 per dozen, net.

The rapid strides in the manufacture of Pocket Cutlery which have taken place within the past few years, were conspicuously brought to our notice by the examination of the line of goods manufactured by The Miller Brothers Cutlery Company, of West Meriden, Conn. These goods, which comprise a fine collection of the most popular patterns, are meeting with a large and steadily increasing demand. In quality, style and finish, the manufacturers guarantee these goods to be equal to the most popular brands of foreign or domestic make. The regular discount to the trade is 25 per cent. from list. For large orders an extra discount is allowed. Samples of these goods can be seen at the warerooms of their agents, J. Clark Wilson & Co., who also carry a stock of the leading styles.

The price of Socket Chisels, Drawing Knives, &c., may be styled irregular, these goods being variously quoted at from discount 60 and 10 per cent. to 60, 10 and 10 per cent.

A couple of weeks ago we noticed the organization of the Douglass Mfg. Co. The following circular has just been issued:

NOTICE TO THE TRADE.

The business of manufacturing and selling Augers, Bits, Chisels, etc., heretofore conducted by various parties and interests, under the style of Douglass Manufacturing Company, has now been placed in the hands of a corporation, duly organized under the laws of the State of Connecticut, in the corporate name of the Douglass Manufacturing Company. The sale of the said goods will be made at the stores of, and under the supervision and direction of, the Russell & Erwin Manufacturing Company, Nos. 45 and 47 Chambers street, New York city, and Nos. 16 and 18 North Fifth street, Philadelphia.

DOUGLASS MANUFACTURING CO.,
M. J. WOODRUFF, President.
August 1, 1874.

The following telegram was received by us to-day:

PHILADELPHIA, Aug. 19, 1874.

To the Editor of The Iron Age: Learning that Parers are being sold at less than the regular rates, we hereby give notice to all our customers that our prices will be strictly maintained, and that we will not guarantee against any other makers.

D. H. GOODELL,
READING HARDWARE CO.

The break in the prices of Rowland's Shovels and Spades has been settled up, and the manufacturers now quote discount 30 per cent., cash.

A meeting of the creditors of Hogan, Clarke & Sleeper was held last Friday, in Boston. The firm presented a statement showing their liabilities, unsecured, $109,000; their stock is estimated at $46,000, and their accounts and bills receivable, $21,000. A committee of three was appointed to consider the interests of the creditors, and report at a meeting to be held next Friday.

Schoverling & Daly, Nos. 84 and 86 Chambers street, have handed us a copy of their new illustrated catalogue, just issued. This firm, as our readers are aware, are extensive manufacturers of Guns and Pistols, and importers of a large line of sporting goods, gun material, ammunition, &c. The catalogue referred to is compiled with great care; the typography and press work is in the best style of the art, and the book, which is comprehensively illustrated, contains a great deal of descriptive matter of great value to dealers in these goods. Their price list, which accompanies the catalogue, is printed on a separate sheet, and is issued semi-annually, or oftener, as occasion requires. We publish below their price list, revised to date, and invite attention to their advertisement on page 24:

METALLIC CARTRIDGES.

Discount 50 and 10 per cent., by the Case 50, 10 and 5 per cent., 100 M. 60 per cent.

Rim Fire.

Nos.	22	22 long,	30	32 short,	32 long,	38 short,
Per M.	$6·00	8·00	11·00	12·00	13·50	17·00
38 long,	41	41 long,	44 long,	44 Henry,	44 Robs'n,	
$18·00	15·00	18·00	24·00	21·00	26·00	
46 long,	56-46,	56 50,	56-52,	56-56,		
$30·00	40·00	40·00	38·00	38·00		

Center Fire.

38 long,	S. & W. 3 Am.,	S. & W. 3 Russ'n,	44 long,
$14·50	16·20	18·90	27·00
45 Winchester,	45 Peabody,	45 Colt's	50-70
$18·00	33·00	22·00	37 50

Colt's Cartridges.

31	36	42-100
$8·50	9·50	11·50 per M.

REVOLVERS.

SMITH & WESSON'S.

No. 1, 22 cal., blued	$7·50
" 1, 22 " nickeled	8·25
" 1, 22 " " engraved	9·25
" 1, 22 " " ivory	9 75
" 1, 22 " " eng'd	10·75
" 1, 22 " " " and gilt	11 50
" 1, 22 " " pearl	11·50
" 1, 22 " " " eng'd.	12·75
" 1, 22 " " " " and gilt	13·50
" 1½, 32 cal., blued	9·00
" 1½, 32 " " nickeled	9·75
" 1½, 32 " " " engraved	11·00
" 1½, 32 " " " ivory	11·25
" 1½, 32 " " " " eng'd.	12·50
" 1½, 32 " " " " and gilt	13·50
" 1½, 32 " " " pearl	14·25
" 1½, 32 " " " " eng'd	15·50
" 1½, 32 " " " " and gilt	16·50
" 3, 44 cal., center fire, blued	16·50
" 3, 44 " " nickeled	18·00
" 3, 44 " " " ivory	21·00

STANDARD, XX.

22 cal., long or short, plated frame	6·50
22 " " nickeled	7·25
22 " " " eng'd	8·25
22 " " " ivory	8·75
22 " " " " eng'd	9·75
22 " " " " " and gilt	10·50
22 " " " pearl	10·75
22 " " " " eng'd	12·00
22 " " " " " and gilt	12·75

STANDARD, XXX.

30 cal., plated frame	7·00
30 " nickeled	7·75
30 " " engraved	8·75
30 " " ivory	9·25
30 " " " engraved	10·25
30 " " " " and gilt	11·00
30 " " " pearl	11·25
30 " " " " engraved	12·50
30 " " " " " and gilt	13·50

LITTLE JOKER.

22 cal., plated frame	$4·00
22 " nickeled	4·75
22 " " engraved	5·50
22 " " ivory	6·25
22 " " " engraved	7·00
22 " " " " and gilt	7·75

The finish of the Joker is not quite as high as on the Standard, but the material and work are A 1. The model is beautiful, and in every particular it far surpasses any of the other low priced pistols.

WESSON & HARRINGTON'S 7 shot, 22cal., blued	$6·50
7 shot 22 cal., nickeled	7·25
5 " 32 " blued	7·50
5 " 32 " nickeled	8·25

The patent Ejector is a great convenience. The 32 cal. is the smallest and neatest 32 cal. Revolver made.

TERROR, 32 cal., blued	$7·75
" " nickeled	8·50
BULL DOG, 38 cal., blued	8·75
" " nickeled	9·50
SWAMP ANGEL, 41 cal., blued	9·50
" " nickeled	10·25
STAR, 38 cal., nickeled	8·00
" 41 " "	8·50
FAVORITE, 22 cal., nickeled frame	4·75
" " full nickeled	5·25
" " " ivory	6·75
TYCOON, 22 cal., nickeled frame	3·50
" " full nickeled	4·00
" " " ivory	5·50
GOVERNOR, 22 cal., nickeled frame	3·50
" " full nickeled	4·00
BLUE JACKET, No. 1, 22 cal., blued	4·25
" " " nickeled	5·00
" No. 2, 32 cal., blued	7·50
" " " nickeled	8·25
X. L. No. 4, 38 cal., blued	8·00
" " nickeled	8·75
ALLEN'S No. 30, 22 cal., blued	5·00
" " " nickeled	5·75
WHITNEY, No. 1, 22 cal. plated frame	4·50
" No. 1½ 32 cal. "	7·50
BACON, No. 2, 32 cal., blued	5·50
" No. 2, 32 cal., nickeled	6·25
MY FRIEND, No. 1, 22 cal., nickeled	6·00
" No. 1, 32 cal., "	7·00

Colt's, Remington and other makes not mentioned, at lowest rates.

CARTRIDGE—Single Shots.

MARLIN'S VEST POCKET. The only first-class vest pocket made, 22 cal.	$2·00
Nickel engraved	2·60
O. K. steel barrels, No. 1, 22 cal., No. 2, 30 cal.	2·50
NEVER MISS. (Light and effective), No. 2, 32 cal. per pair	6·00
VICTOR. (Shoots with great penetration) 38 cal. per pair	6·50

These Pistols are of the finest quality, heavy plated frames, steel barrels and rosewood stocks.

KENO, malleable iron, nickel frame, 22 cal	$1·75
STEVENS'. Tip-up barrel, No. 1, 22 cal., No. 2, 30 cal	3·00
WILLIAMSON'S DERINGERS, 41 cal., per pair	8·50
COLT'S " 41 cal., "	7·20
REMINGTON " double shot	6·40
SHARP'S, Nos. 1, 2 and 2½	4·00
" No. 3	3·50
"1776," No. 22, blank cartridge, per pair,	1·75

POWDER AND BALL PISTOLS.

	Per pair.
UNCLE SAM, all bright, 2 in. barrel	$1 05
" " 3 in. "	1·10
" " 4 in. "	1·15
HERO, brass frame, 2, 3 and 4 in. barrel	1·35
No. 15, Round barrels, 2½ and 3 in., blued	1·25
No. 10, Octagon " 3 in., blued	1 25
No. 11, " " 3 in., bright	1·25
No. 75, Round " 2½ in., fancy finish	1·75

DOUBLE BARREL.

	Per pair.
No. 30, Round barrels, 2½ in., blued	$2·50
No. 20, Octagon " 3 "	2·50
No. 22, " " 3 " bright	2·50
No. 150, Round " 2½ in., fancy finish	3·50

CAPS.

	Per M.
G. D. American	$ 37
S. B. "	38
G. D., French, best quality	55
S. B., Genuine "	55
B. B., " "	43
MUSKET, in paper boxes	75
" " tin "	80
U. M. C., same quality as E. B., 1-4	65
" " " 1-10	70
ELEY'S, E. B 1-4	66
" " 1-10	73
" D. W. P. 1-4	1·70
" " 1-10	1·80
" Colt's, 1-10	95
" Breech loading	1·70

WADS.

	Per doz.
AMERICAN PAPER	$1·25
BALDWIN'S " 9 and 10 gauge	2·10
" " 11 and up. "	1·60
ELEY'S Black edge, 9 and 10 "	2·70
" " 11 and up. "	2·20
" Pink edge, 9 and 10 "	4·80
" " 11 and up. "	3·90

	Per M.
" Card board, for breech loaders, 10 g.	$ 55
" " " " 12 g.	45
	Per lb.
" Thick felt " "	95
	Per M.
U. M. C., " " " 10 g.	$2 25
" " " " 12 g.	2 00

We have received an illustrated catalogue of Malleable Iron Castings manufactured by Torrance, Merriam & Co., proprietors of the Green Island Malleable Iron Works, Troy, N. Y. This book gives cuts of a very large variety of Carriage and other Castings made by this firm, the weight and dimensions being given in each instance. They also make J. C. Covert's Patent Breast Hold Back, Sabbaton's Patent Malleable Iron Screening Shovels, three styles of Malleable Clamps for wood workers, and Chamberlin's Patent Clamp Whip Sockets.

We have received the following letter from a well-known manufacturer on the subject of the controversy between Geo. D. Hall, of St. Louis, and Hall, Kimbark & Co., of Chicago:

To the Editor of The Iron Age—DEAR SIR: I cannot see from my standpoint as a business man how the judge could have decided any differently in the case of Hall *vs.* Hall, Kimbark & Co. H K. & Co. did not deny that they filled orders received on the basis given by their price list. By accepting and filling orders at the prices named in their own price list, they demonstrated its meaning, and by their own construction gave it its lawful and business construction. I have yet to see a hardware merchant who does not approve of the decision given.

The third paragraph of your quotation from Geo. W. Smith reads: "When the instrument "containing it falls into the plaintiff's hands "as one of many, without immediate design on "the part of the defendants, it was the duty of "the court," etc. Hall, Kimbark & Co. did not, in their answer to Geo. D. Hall, directly refuse to sell, but made three stipulations, to all of which Hall agreed, but none of which they had any right to ask, not having them on their price list.

There is no doubt of the truths having been told in the last clause of their letter of February 8th, when they say they were obliged to check the sales of P. & W., and there is no doubt but what they sent their price list to Geo. D. Hall, with intent to stay the sale of 4000 pair of springs to Hall by P. & W. if they could. This shows plainly the design and intent, and is, as I understand it, the legal point in this case.

I look upon the case, in a business light, as follows: Geo. D. Hall, as a good business man, had no other chance to protect his purchase of 4000 pair from P. & W., at $1·25 per pair, than by buying largely of H. K. & Co. at $1·00 per pair. For if all the small dealers in St. Louis bought 100 pairs or over at $1·00 per pair, they could sell at his cost and make money, while he could not make sales without losing money on his purchase from P. & W.

The sharp practice of the case was as follows: Hall, Kimbark & Co. thought they would beat Parkhurst & Wilkinson. They thought that P. & W., with the zeal and indiscretion of a young house, would send out another price list at a lower rate, when they would let P. & W. make their sales at a loss. They no doubt thought that as they had made a drop of 25 cents, P. and W. would do the same, but it did not work as they anticipated, for P. and W. did not issue another list. Feeling certain that H., K & Co. were selling at less than cost, while their own sales had realized a small profit to themselves and the manufacturers, they adopted the same tactics, and Hall, Kimbark & Co. got their own fingers caught in the trap while setting it.

Now, Mr. Editor, I must disagree with you in the position you have taken. I have had 25 years' experience in manufacturing and selling steel and steel goods, and whenever I have ordered goods or machinery from price lists, I have always expected to get, and always have gotten, the articles at the prices named. I have never sent out a price list without the intention of selling and forwarding goods at prices and terms quoted; and I have yet to hear of the first N. Y. house that sends out price lists with quoted prices and discounts that does not intend to, and that does not fill at the prices named, all orders received within a reasonable time, after they have been sent to their customers, or to those they would like for customers.

There is a difference well understood between a circular of "Prices Current" as issued by Thos. J. Pope, and others, and a price list as sent by the manufacturers and jobbers.

Yours truly,
W. A. SWEET,
Syracuse, N. Y.

As for that part of this letter which is taken up with a consideration of the reasons of Hall, Kimbark & Co. for making the price they did, we have nothing to say; but we do assert that a merchant or manufacturer does not, by sending out a price list, make such an offer to sell as compels him to accept the orders of any of those who receive it, in such quantities as they may see fit to order. If this were the case, the selection of names for the sending of price lists would be the most difficult and responsible part of the conduct of any business. It would not do to send price lists to all the trade of the whole country, or a given section, as is now the custom, because, after the circular was sent, any order given by any house that received it must be filled, even if the quantity were considerable and the house ordering were irresponsible, for the sending of the circular would be held to be an offer to sell, which must be made good if the party receiving it accepts within a reasonable time. Every one knows that such has not been the idea of the Hardware trade. They have sent out their circulars freely, and have considered the question of the solvency of those to whom they sent them only in a general way, reserving the more particular consideration of that matter till an order was received. According to the ruling of the judge in Hall, Kimbark & Co.'s case, they could not have demanded the money for these goods before they delivered them, for the prices they quoted were for cash in 30 days, and even if the person receiving the circular were bankrupt, he could say they offered him 30 days' credit in their circular. Of course, we know that a clause might be invented that would shield the house sending out price lists; but the question at issue is one of commercial usage, and that has been so clearly understood that we do not think the business community should be compelled to change their established methods because a judge has decided that a price list meant so much more than they supposed.

BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*)
WEDNESDAY, Aug. 19, 1874.

Scotch Pig.—The market is quiet, with a steady demand. Prices are firm, and a fair amount of business doing. We quote Makers' prices:

Gartsherrie No. 1	116/
Eglinton No. 1	94/

Manufactured Iron.—The demand is falling off and prices are weakening, though there is nominally no change in quotations. We still quote Best Staffordshire Bars £10. 10/ @ £12.

Rails.—Welsh Rails may still be quoted £7. 10/ @ £8. 5/.

IRON.

American Pig.—There is no improvement to report in the Iron market. Consumption does not increase, and the production is greater now than a few weeks ago, owing to additional furnaces being put in blast. There seems to be no doubt that stocks are increasing on the furnace banks, though consumers have very little, and show no disposition to buy any large quantity. We hear of no sales of importance. We quote Foundry No. 1, $30 @ $32; Foundry No. 2, $28 @ $30; Gray Forge, $25 @ $28. Prices are, however, irregular, and these quotations could be shaded for brands not considered strictly first-class.

Scotch Pig.—Advices by mail from Glasgow, under date of the 6th instant, state that the ironmasters had decided to increase the number of furnaces in blast from 70 to 120. When this was made known the ring speculators on the Glasgow exchange advanced prices 2/ per ton, which they could easily do, as the stock was reduced to 25,000 tons, 11,000 tons of which was controlled by warrants, the possession of which decided the price. Here the stock has been reduced to the lowest limits. Eglinton is now firmly held at $33·50 @ $34; Glengarnock is held $34 @ $35. There is no Gartsherrie, Summerlee, Langloan nor Coltness here, nor is there much on the way, as there is no inducement to bring it in, importers claiming that present prices would not pay cost, with freight free. Of course the wants of consumers are very small.

Bar.—The demand for Bar Iron still continues to be light, and of hand-to-mouth character. Mills that are running are firm in their prices, and there is less cutting under than at any time this year. So noticeable is this firmness that we are confident that any quickening in the demand would at once send the prices of Eastern mills up at least one-tenth. We hear from Pittsburgh that there is an effort making to advance the card rates there.

Rails.—We note the sale of 4000 tons Welsh and 5000 tons American Steel on private terms. We quote: Welsh, $48 @ $50, gold; and American, $56 @ $58, currency, at works.

Old Rails.—There is no change in the market, and we hear of no transactions. We quote, as last week, $34 @ $35.

Scrap.—We quote Wrought, from yard, $35 @ $37, but these quotations are nominal in the absence of transactions.

METALS.

Copper.—A moderate business has been transacted during the week, both for export and consumption, aggregating some 250,000 to 300,000 pounds, the bulk of which to manufacturers at 19¼c., and the remainder for export at 19c., but the latter figure is too high for export to Europe, and in order to push off more of it it would have to go lower. The large holders ask 19½c. @ 20c., and expect buyers will be forced to pay these figures, but the manufacturers are becoming accustomed to the low prices, and are not as anxious to buy as they were a week ago. No large business can be done at 19c. @ 19¼c., unless some new feature turns up. Some operators are reported to be in the market, and the formation of another ring is spoken of as impending. It hardly seems likely, however, that a fresh speculation can be seriously thought of with the late experience before us. We shall be told that at 19c. it may prove a success, while at 23c. it proved a failure; but the real difficulty in the way still exists, regardless of the difference in price—we mean the stagnation in business. All we can and do expect actual consumption to take off the hands of holders is 2,000,000 pounds monthly; there is no immediate prospect for any increase in this, and as long as the requirements thus remain moderate, another attempt at a corner would lack the support from actual trade that were necessary to render it successful. A great deal of hesitancy and doubt has, of course, been bred in the minds of people with respect to this metal, nobody being able to determine what the next move may be at the hands of holders of it in a hypothecated form, and the result is that legitimate consumers continue to buy merely from hand to mouth, apprehending as they do that it may drop to 18½c. ere long. Europe remains steady; London, yesterday, £86, English Best Selected, and Chilian Bars £76. 10/. The Brazilian cable and the lines that connect Rio Grande do Sul overland *via* Montevideo with Valparaiso, have now been made to co-operate for the conveyance of telegraphic intelligence, there being but a trifling gap in the chain between the former two places, and accounts now reach London from Valapraiso but 24 hours old. The consequence of this rapid communication will be greater steadiness in spot Copper at London. A coming deficiency in the supply of Chilian Copper can now be counteracted by a telegraphic order and steam shipment, sixty days or less sufficing to have the Copper on the English coast. On the other hand, the gambling in "futures" in or near the places of shipment will increase, and by means of the cable the London Copper speculators can now operate direct in Chili from one day to another. Speculation in Copper "futures" will thus be indefinately increased between those places, and should we continue to export to Europe, the same operators will also seek our market for identical purposes. Through a series of recent occurrences, Copper in our midst has been mixed up with bankers and the speculative element here and abroad, new influences have been made to bear upon it, and we have to take them into consideration if we mean to form as correct a judgment as we can. We quote Lake at the close 19c. to 19¼c. Meanwhile the manufactures of Copper are also irregular in value, and we quote them nominally as follows: New Sheathing, 30c. to 31c.; Bolts and Braziers, 32c. to 33c.; Bronze and Yellow Metal, 22c. to 23c., and Yellow Metal Bolts, 30c., net cash.

Tin.—Hypothecated lots of Tin, emanating from the late failure of the Copper speculating firm, having been disposed of in the market, some 3000 to 4000 Slabs Straits Tin sold at about 21½c., gold, and on private terms, furthermore, some 50 tons Refined and L. & F. English. Straits Tin, to import it here, stands in between 21½c. and 22c., gold, and sells in a jobbing way at 22¼c. to 22½c., gold, the present quotation, while we quote English Refined 21½c., L. & F. 20¾c., and Banca 25½c. to 26c., all gold. The stock of Banca is trifling, say but 100 Slabs all told. A fair consumptive demand is observable for the various descriptions. Nothing has transpired to arrive. Per cable we have the London quotation of £98 English L. & F., an improvement of £1, equal to 21¼c., gold, laid down here. The Dutch sale of the 29th ultimo went at 56½ guilders, average, and the market subsequently improved, the quantity taken by consumers being larger than had been anticipated on the occasion. A fair jobbing demand has prevailed in Tin Plates, the sales effected summing up between 2000 and 3000 boxes, on the following basis, which we still quote to-day, the market closing steadily, and tolerably firm: I. C. Charcoal, $9·87½ @ $10·50, gold, per box; I. C. Coke, $7·87½ @ $8; Coke Terne, $6·75 @ $7, and Charcoal Terne, $7·75 @ $8, all gold.

Lead.—The government, in effecting the sale alluded to in our last, placed 700 tons of good foreign brands at $5·65, gold, the 100 pounds, which is equal $5·70, gold, laid down in the city, while at private sales 100 tons Domestic sold at $5·70, gold, in lots. Of Foreign, various lots were also taken at between $6·45 and $6·50, gold, the 100 pounds, and it remains quiet and firm at 6½c., gold, per pound. The higher price for Foreign Lead at private sales is accounted for by the drawback which the manufacturer receives on his wares, not allowed on articles made from government Foreign Lead. The government officials will come out with another sale a month hence. Their management has at all times been approved of by the trade at large, and in this instance also deserves a due measure of praise. Since the 8000 tons have to be disposed of, it is done gradually, in lots and at prices to steady the market, instead of interfering with it, and the whole thing works as smoothly as could be expected under the circumstances. The manufactures of Lead are quiet at the following rates: Bar, 8½c. per pound; Pipe, 9c.; Sheet, 9c., with 22½ per cent. discount; and Tin Lined Lead Pipe, 16½c., less 10 per cent. The following important tariff decisions under the United States revised statutes have just been promulgated: "Pig Lead imported from and after the 22d of June, 1874, is entitled to the reduction of 10 per cent. off the duties under the provision in section 2503, of the Revised Statutes of 1874, which makes such reduction on 'all metals not herein otherwise provided for,' the Department holding that the word 'herein' in such provision refers to said section only."

Spelter and Zinc.—Under some peremptory orders to close out a not inconsiderable quantity of Domestic Spelter received from the West, the low price of 6½c., currency, had to be accepted—a figure ruinous to the producer, since when no more is for sale below 6¾c., currency. The stock of Foreign is quite light, but the demand for it is but moderate, special brands of Silesian commanding, as heretofore, 6¾c., gold, and inferior foreign ones but 6½c. to 6⅝c., ditto. Europe is quiet. The better inquiry that was expected in our midst as likely to grow out of increased activity in the use of Copper, has not yet manifested itself, but may arise ere long. Sheet Zinc is also quiet at 8c. @ 8¼c., gold.

Antimony.—The same want of activity lately reported continues, and we quote the metal unaltered at 11⅝c. @ 11¾c., gold, with but trifling sales.

COAL.

The Coal market, as far as business is concerned, is without any material change. Trade in Bituminous is very dull; but in Anthracite a steady business is reported.

The quantity sent from the Schuylkill region for the past week was 107,937 tons by rail; and 13,818 tons by canal; for the week 121,755 tons; against 104,555 for the corresponding week last year. Increase, 17,200 tons. The quantity sent from all the regions was 435,575 tons Anthracite, and 72,371 tons Bituminous. Total for the week 507,946 tons, against 529,203 tons for the corresponding week last year. Decrease 21,257 tons.

The market for Bituminous is very dull. Prices are about the same as last quoted, and no change is expected for some time. The quotations of Anthracite are advanced somewhat. We quote: $5·40 @ $6·25, by the cargo. For Gas Coals the prices are: Pennsylvania and Westmoreland Gas, $7·50 @ $8; West Virginia, $7·25 @ $7·50; Cumberland, soft, $6·75 @ $7; American Cannel, $12 @ $14.

Foreign Coals are in limited demand. Ince Hall Cannel, $18 @ $19; Liverpool, do., $17 @ $18; Gas Coal, Newcastle, $7·50 @ $8; Liverpool Orrel, $9 @ $10; Scotch, $8 @ $9·50.

During the week ended August 15th the amount of Coal shipped over the Cumberland and Pennsylvania Railroad was 53,040 tons, an increase of 18,987 on the shipments of the same week last year. The total shipments for the year are 1,247,078 tons, a decrease, as compared with last year, of 67,862 tons. The shipments by the Cumberland Branch Railroad for the year are 149,297 tons, an increase of 17,330 tons over last year.

OLD METALS, PAPER STOCK, &c.

The market for Old Metals, Rags and Paper Stock still continues very dull, owing principally to the fact that most of the mills are being run on half and two-third time; also, that dealers are not anxious to sell at the low prices offered. There are no changes to note in purchasing quotations, but we note a few in selling prices. We quote the following as the dealers' purchasing rates:

Old Metals.—Copper, 15c. @ 16c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 14c. @ 15c.; Lead, solid, 5½c.; Tea Lead, 4c.; Zinc, 4½c. @ 5c.; Pewter, No. 1, 19c.; do., No. 2, 8c. @ 12c.; Spelter, 5c. @ 5½c., Wrought Iron, 1¼c.; Sheet do., ½c.; Cast, do., ¾c. @ 1c.; Machinery, do., 1c.

Rags, &c.—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No. 1, 6c. @ 6½c.; No. 2, 2½c.; White, No. 1, 6½c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 4½c. @ 5c.; Gunny Bagging, 1¾c. @ 1¾c.: Jute Butts, 1⅝c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 2¾c. @ 3c.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending August 18, 1874:

Hardware.

Alt C. & Kuffner, Cases, 3
Booth R. W. & Co. Casks, 1
Boker Hermann & Co. Mdse. pkgs., 33
Beam & Murray, Mdse. pkgs., 4
Drexel, Morgan & Co. Cutlery, cs., 4
Doun James & Bro. Guns, cs., 4
Field A. & Co. Packages, 127 Arms, cs., 4
Fuller Bros. Anvils, 125 Files, cs., 1 Cutlery, cs., 1
Frasse P. A. & Co. Cases, 3
Hayden & Tompkins, Casks, 1
Hilger E. & Sons, Mdse. pkgs., 35
Harwood Wm. A. Cases, 6
Leopoldt & Mayer, Cases, 1
Lau & Garlichs, Mdse. pkgs., 19
Mason John W. & Co. Wire rope, coils, 16
Moore's J. P. Sons, Mdse. pkgs., 8
Merchants Dispatch Co. Guns, cs., 4
Peters Carl, Cutlery, cs., 2
Robbins Chauncy, Mdse. pkgs., 2
Russell & Erwin Mfg. Co. Files, pkgs., 4
Schoverling & Daly, Mdse. pkgs., 7
Spies, Kissam & Co. Mdse. pkgs., 6
Tomes Francis, Cases, 3
Tillotson L. G. & Co. Wire, lots, 201
Van Wart & McCoy, Mdse. pkgs., 77
Van Nest A. R. & Co. Cases, 2
Wiebusch F. Mdse. pkgs., 11
Ward A. Mdse. pkgs., 3
Order. Files, cks., 21 Wire, coils, 125 Packages, 235

Iron.

Bellows F. W. G. Scrap, rails, tons, 38
Congreve Chas. & Son, Rails, 878
Lang W. Bailey & Co. Rails, 97
Naylor & Co. Rails, 574 Fish plates, bdls., 377
Oelriche & Co. Casks, 736
Pesant J. A. Scrap, tcs., 46
Randolph L. V. F. Rails, 914
Seligman J. & W. Spiegel iron, lots, 1
Order. Scrap, tons, 10 Scrap, rails, lots, 1

Steel.

Angill Chas. Bundles, 97
Hogan John, Cases, 27 Mdse. pkgs., 22
Naylor & Co. Cases, 40 Rails, 2506 Bessemer rails, 556 Tires, 9 Mdse. pkgs., 34
Prosser Thos. & Son, Tire forgings, 8 Mdse. pkgs., 60
Pierson & Co. Cases, 1
Sanderson Geo. & Co. Casks, 2
Vose, Dinsmore & Co. Bundles, 84
Order. Cases, 16 Casks, 1 Bundles, 289 Bars, 11 Spring, tons, 100 Rails, 2017

Metals.

Bruce & Cook, Tin plates, bxs., 755 Mdse. pkgs., 19
Byrne Joseph & Co. Tin, ingots, 814
Haxtum B. Lead, bars, 302
Naylor & Co. Tin plates, bxs., 115
Phelps, Dodge & Co. Tin plates, bxs., 2996 Mdse. pkgs., 141
Shepard Sidney & Co. Tin plates, bxs., 121
Order. Tin plates, bxs., 5172 Lead, pcs., 804

PHILADELPHIA.

PHILADELPHIA, Aug. 18th, 1874.

The improvement noted in the Iron market continues, and the feeling is decidedly stronger than last week, although the continued warm weather keeps business men away, and the mills quiet. In Pig Iron the demand heretofore noted for Forge Iron has extended to foundries, and choice brands of Nos. 1 and 2 are in fair request. In some cases this has resulted in considerable transactions, and to the entire consumption of the stocks of some furnaces; while this is actually the case with two or more furnace companies, one of which is on the Schuylkill, others, and of course the majority, have large stocks still. In one case, however, we hear of a furnace owner, with a considerable stock, who refuses to sell at any present price or to contract ahead. The belief is prevalent, among those generally best informed in the trade, that no material advance in Pig Metal is to be expected (or desired to increase trade) this fall, although before the close of navigation an advance of $3·00 to $3·50 per ton may be looked for. Here there is no speculation to note, but to the Eastward it is reported iron is being bought up in considerable lots.

In Manufactured Irons, Bars are fairly active for the times in this vicinity, while there is less disposition on the part of Western mills to cut under Eastern prices, and card rates are said to be but slightly shaded in Pittsburgh. In Rails the improvement continues, and there are several large contracts in abeyance, but likely to be placed before the close of this. A prominent canal and railroad company is also in the market for 5000 tons of Steel Rails, Foreign or American, but at this writing have not closed contract.

In Old Rails the market has been somewhat weakened by forced sales of some 2000 tons in New York, at a low figure, owing to a failure.

Scrap continues in request, and if anything is rather more sought for than at our last.

A considerable quantity of Iron has been sold which is not reported, and although no disposition is apparent to bull the market, the general impression is of a more active demand at once. Buyers continue very cautious, however, and most offers are under the views of sellers. The following prices are continued, viz.:

PIG METAL.—No. 1 Foundry, $31 to $32; No. 2, $28 to $29; Gray Forge, $26·50 to $27; White and Mottled, $23 to $24.

BARS.—3c. per lb,

RAILS.—$58 to $64, at mill, as to make and section.

OLD RAILS.—$36 to $37.

SCRAP.—$33 to $35, as to selections.

The sales include, among many others kept private:

PIG IRON.—Nos. 1 and 2 Foundry, 3000 tons, p. t.; No. 2 Foundry, 2000 tons, $28; Gray Forge, 1000 tons, $26·50, furnace.

RAILS.—1000 tons 56's, equal to $60 at mills.

OLD RAILS.—2000 tons, New York, $32, forced sales; 2000 tons Ts, here, private terms.

SCRAP.—Sales of an aggregate of 600 tons in varied lots at prices to suit quality.

(By Telegraph.)

Aug. 19.—The sale of 5000 tons Steel Rails is reported—3000 by the Cambria Co., and 2000 by the Rensselaer Works—at a private price, stated to be less than $90, at tidewater. The Delaware and Hudson Canal Co. was the purchaser.

Messrs. BLAKISTON & COX, Iron Merchants, 333 Walnut street, under date of Aug. 17, 1874, report as follows: There are two features in the Iron market which will have an effect on raw materials, and upon the general condition of trade. These are, a disposition on the part of foundrymen and mill owners to advance prices on their products, and a steady inquiry which has lately set in for Foundry and Forge Pig Iron, and, in the scarcity of the latter, for Wrought Scrap and Old Rails. Encouraging reports reach us from the Lehigh Valley furnaces. The companies there are generally, and with only one or two exceptions, in a better position than many think. At many of the furnace banks large stocks are noticed, but, with the exceptions mentioned above, all this stock is sold, and waiting the demand of the owners for shipment. Several furnace companies report to us by letter that they are largely sold ahead on Gray Forge, and will not quote price for this grade. Some of the Cinder Irons produced in the Schuylkill Valley are still quoted at ridiculously low prices, but this has little effect upon other brands, prices for which are a little stronger, but remain the same. It is believed the business of the next few months will be good, so far as sales are concerned, but the profits will be small. The recent sales of Pig Iron include 300 tons No. 1 Foundry at $32; 100 tons No. 1 do. at $31; 200 tons No. 2 Foundry at $29, and 500 tons Gray Forge at $28·50; all delivered here. Prices are quoted: No. 1 Foundry at $31 to $32; No. 2 Foundry at $29 to $30; Gray Forge, $27 to $29, on cars in this city. *Bar Iron* is quoted at 3c., at mill. *New American Rails* at $59 to $61, at mill, according to pattern and weight. *Old Rails* are quoted at from $31 to $36. *Scrap.*—No. 1 Wrought at $31 to $33; Cast, 1c. per lb.

CLEVELAND.

Messrs. READ & DICKEY, Iron Brokers, under date of August 17, write us as follows:

PIG IRON.—The market for all grades remains substantially as reported in our last. Dull, drooping and heavy for Charcoal, Bessemer and Foundry grades, and buoyant for No. 1 Gray Forge. The amount of really good Gray Forge is very light, while the stock of cheap (in quality) is quite plenty and of slow sale. To meet the low prices of the past nine months, cheap Ores and a large percentage of mill cinder was used at many furnaces, but most manufacturers of Bar Iron, who have any pride whatever about their reputation, give these "poor peace offerings" the cold shoulder. Makers have believed it enough for them to do to lose their money, without losing their reputation at the same time, and confine their purchases mostly to the best grades offered. Light as the output of Ore may be from Lake Superior mines this season, it is encouraging to know that the quality of the Ore is the very best, and if properly manufactured through its course to Finished Iron, the product must be excellent. Prices are as follows:

CHARCOAL PIG IRON FROM L. S. ORE.

Nos. 1 and 2 Foundry	$38·00—4 m.
Nos. 3 and 4 Car Wheel	40·00—4 m.
Nos. 5 and 6	43·00—4 m.
Bessemer Metal, Charcoal	38·00—4 m.
Bessemer Metal, Bituminous	30·00—4 m.

BITUMINOUS PIG IRON FROM L. S. ORE.

No. 1 Foundry	$30·00—4 m.
No. 2 Foundry	28·00—4 m.
No. 1 Gray Forge Red Short	28·00—4 m.
No. 2 Gray Forge Neutral	27·00—4 m.
White and Mottled	26·00—4 m.

PIG IRON FROM BLACK BAND ORES.

Massillon No. 1	$33·00—4 m.
Massillon No. 2	31·00—4 m.
"New Gartsherrie" No. 2	33·00—4 m.
Muck Bar	$44·50 @ 45·50—60 days.

MANUFACTURED IRON.—There is little or no change to note. Manufacturers are well supplied with orders, and in many cases sold ahead far into September, and in some instances into October. We are aware of some large orders being placed within the last week, and as soon as any mill lets it be known that they are approachable, orders are not wanting, and prices are well maintained. But a very small proportion of the Iron wanted for fall trade has yet been contracted for. Trade in agricultural districts has but recently begun to feel the approach of "better times." Farmers have been too busy through the fair weather to spend any time off their farms. Rainy days of late have been too few, and the actual consumption of iron in its varied forms has not attained its highth for the fall season, although largely increased. The merchants have been and are preparing for it. Large manufacturing establishments, especially of agricultural implements, wagons, &c., are in the market for their stocks. Several buyers, having "faith in the future" (a little more than they just know what to do with), are trying to place their orders with manufacturers for next year's delivery. Unquestionably a good policy for them, but the manufacturers of the Iron see no object in it for themselves, and such efforts fail, as they deserve to.

NAILS.—The factories are busy, and prices remain the same. Manufacturers generally are refusing large contracts for future delivery, preferring to take their chances on the market and sell as they make.

SHEET IRON—Very firm and in active demand. Prices from store here are as follows:

	Rates 60 days.
Bar, Band and Hoop Iron	$2·70
Sheet Iron, No. 24	4·60
Nails, 10d. to 60d	3·60
Ship Spikes, ⅜ and larger	4·25

LOUISVILLE.

Mr. GEO. H. HULL, under date of Aug. 17, writes us as follows: There is more inquiry for Hot Blast Metal, and prices are firm at quotations. The supply of Cold Blast is in excess of the demand, and the market is dull for this class of Irons. The usual time, four months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores			$33·00 @ 34·00
" 2 "	"	"	30·00 @ 31·00
" 1 Forge,	"	"	28·00 @ 29·00
" 1 F'dry, from Tennessee Ores			31·00 @ 32·00
" 2 "	"	"	28·00 @ 29·00
" 1 Forge,	"	"	27·00 @ 28·00
" 1 F'dry, from Alabama Ores			31·00 @ 32·00
" 1 "	"	Iron Mountain Ores	32·00 @ 35·00

HOT BLAST STONE COAL.

No. 1 F dry, from Missouri Ores			33·00 @ 34·00
" 2 "	"	"	30·00 @ 32·00
" 1 Forge,	"	"	29·00 @ 30·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores			50·00 @ 54·00
" "		Tennessee Ores	46·00 @ 48·00
" "		Alabama Ores	48·00 @ 50·00
" "		Georgia Ores	48·00 @ 50·00
" "		Missouri Ores	46·00 @ 48·00
" "		Kentucky	48·00 @ 50·00

BOSTON.

BOSTON, Aug. 16.—Pig continues to sell in a moderate way in small lots, while there is still to be noticed small encouragement for a better future in the fact that each week some new faces this season are seen in the market, inquiring, and now and then making a small and starting purchase. A considerable part of this improvement might be traced to Moseley, Hodgman & Co., who have put flyers on the market, of some of which they advertise being able to offer lots at the very bottom prices. In constant telegraphic communication with New York, Philadelphia and Pittsburgh, they can quote the least shadings to values. Bar is very dull, and yet the week has been, on the whole, the best in a month. There has been a small inquiry from tool makers, and a number of large country blacksmiths have been in, buying general assortments, an event with the trade of unexpected joy. There has also been a small trade during the week in small lots to country storekeepers and dealers, which has moved a fair amount of goods. Steel is still very quiet, though here and there the tool makers in have bought some stocks. We quote yard lots of American Pig Iron at $36 to $40 per ton, including No. 2 extra at $34 to $36, and No. 1 at $36 to $38. We quote Eglinton at $38, Coltness and Gartsherrie at $45 to $46, Charcoal at $45 to $55. American and English Refined Bar Iron is selling at $65 to $70 per ton for the ordinary sizes, and $85 to $90 for extra sizes, according to size. Cast Steel is selling at 16c., gold, for English, 18c., currency, and 15c. to 16c. for American, currency, with fancy brands of English selling at 17c., gold. Anchors are selling at 8c. per lb.; Chain Cables (⅝ to 2 inches thick), 5½c. to 7c. per lb.; Coil Chains, from 3-16 to 1¼ inches, 7c. to 15c. We quote Boiler Plates at 6⅞c. to 7½c. for Flanges, 4⅝c. to 5c. for C No. 1, and 4½c. to 4⅝c. per lb. for Common and Tank. Russia Sheet is selling at 16½c., gold, and 18c., currency, for perfect lots. English and American do. are selling at 5½c. to 7c. per lb., currency. We quote Galvanized Sheet Iron, No. 20, at 9½c.; Nos. 21 to 24, 10¼c.; 25 and 26, 11¼c; 27, 13c.; 28, 13½c. Nails are selling at $4 for 10d to 60d, and other sizes at a range of $4 to $8 per 100 lbs., net. Horse Nails, 28c. for No. 7. Metals are very idle. Copper continues to be unsettled and weak, and stock operators, who were last week so prophetically pointing to 19c. before the next Saturday, are now suggesting 17c. as the probable point at which the decline will hold. There have been sales quoted at 18½c. The whole appearance of the market seems to be against Copper stocks, which, as will be seen in the financial review, are sad enough. Copper men have figured the position thus:

	Pounds.
Over production for the year	5,000,000
Loss in consumption	9,000,000
Stock of Calumet	14,000,000
" Quincy	1,500,000
" Copper Falls	500,000
" other companies	1,000,000
Total pounds	31,000,000

which they conclude is now upon the market, with production still going on, while in active years the consumption of Copper has been 38,000,000 pounds. If the other side have any position statistically they will not show it. Our quotations are wholly nominal. The Old Metal market presents some interesting points. *Copper.*—We quote Ingot at 19c.; Sheathing, 33c.; Yellow Metal, 23c. *Lead* is dull. We quote Sheet and Pipe, 7½c., currency; Tin-lined Pipe, 16½c.; Bar Lead, 7½c., less usual trade discount; Pig, 6½c. for foreign, gold, and 6½c. currency, for domestic. *Spelter* is lower; sales 10 tons at inside quotations. American, 6⅝c., currency. *Tin* is easier. Straits, 23c.; sales 100 pigs at 22⅝c.; Refined English, 21¼c., gold. Charcoal I. C., $11·50 to $12; Coke, $9 to $10; and Terne at $8·50 to $12·50 per box, currency.—*Commercial Bulletin.*

CINCINNATI.

Messrs. ADDY, HULL & CO., under date of August 17, write us as follows: The market remains about as last reported. No change from present prices is looked for before the fall months, the prospect being favorable for a general improvement in demand with the arrival of that period.

HOT BLAST CHARCOAL.

Hanging Rock No. 1	₩ ton	$34·00 @ 35·00	—4 mos.
" " No. 2		31·00 @ 33·00	—4 mos.
" " Forge		29·00 @ 30·00	—4 mos.
Tennessee No. 1		32·00 @ 33·00	—4 mos.
" Forge		29·00 @ 30·00	—4 mos.
Alabama No. 1		32·00 @ 33·00	—4 mos.
Missouri No. 1		34·00 @ 35·00	—4 mos.
" No. 2		31·00 @ 33·00	—4 mos.

HOT BLAST STONE COAL.

Missouri No. 1	₩ ton	$32·00 @ 33·00	—4 mos.
" Forge		29·00 @ ..	—4 mos.
Ohio No. 1		30·00 @ 32·00	—4 mos.
" Forge		25·00 @ 29·00	—4 mos.
Scotch Pig, No. 1		.. " ..	

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel	₩ ton	$50·00 @ 55·00	—4 mos.
Missouri " "		48·00 @ 52·00	—4 mos.
Kentucky " "		50·00 @ 55·00	—4 mos.
Tennessee " "		48·00 @ 52·00	—4 mos.
Georgia " "		48·00 @ 52·00	—4 mos.
Alabama " "		48·00 @ 52·00	—4 mos.
Machinery and Forge		45·00 @ 48·00	—4 mos.
Blooms		90·00 @ 95·00	—4 mos.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of August 18: We note the market as fairly active for the season, but an absence of that accustomed activity incident to the same. We quote the list unchanged, but firmer.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	2·9 to 3·1 cts. per lb.
1 to 4½ wide by 1½ to 2 thick	
Round and square, ordinary sizes, from ⅜ to 2 inclusive	2 9-10 to 3 1-10c. "
Hoop Iron, 1¼ wide and upward	4¾ to 5c. "
Band Iron, from 1¼ to 4 in. wide	4 to 4¼c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ½ thick	4½ to 5c. "
Norway Nail Rods	7¾ to 8¾c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	16¼c. "
Machinery Steel	11½c. "
Cast Spring Steel	11c. "
Homogeneous Steel Plate	13c. "
Perkins' Horse Shoes, per keg of 100 lbs	$5·87½
" Mule Shoes " "	6·87½

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per lb.
	10	9	8	7	6	
Globe Horse Nails	23	24	25	26	28c.	per lb.

R. R. Spikes.....5¼ by 9-16 at 3¾c to 4c. per lb.

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger, Spence & Co., London, Glasgow and Manchester, under date of Aug. 1, 1874, report:

Metals—It is gratifying to have again to report an improved demand for Pig Iron, and all the more so as what is sold on home account is taken for consumption, speculation being at the moment of insignificant proportions. In the North of England and Cleveland district Foundry Iron is in most active inquiry, and in consequence of stocks in consumers' hands being very limited, Forge is attracting more attention, without, however, any advance of note in prices. In Scotland, it has been decided to put three-fourths of the furnaces in blast, as the restricted production coming upon the autumn shipping season is causing an increased demand. The business done in Scotch Pig Iron during the greater part of the week has been large, and prices have advanced 2/ to 3/. Shipments, however, do not appear to have followed in the ratio of last week, being 8488 tons against 11,085 of the corresponding period of

1873. The total decrease for 1874 is now 139,855 tons, and as compared with 1872, 311,564 tons. Copper has been very dull at a reduction, and quotations continue nominal. The news of heavy Chili charters in the first fortnight of July, amounting to 1500 tons Bars and 1400 tons Ores and Regulus, following close on the sales of Lake Superior Copper, has caused disorganization in the market, and the sales made on the spot are very limited. In Tin a better feeling has prevailed since the favorable results of the 22,000 slabs of Banca became known. Owing to a good demand Lead is scarce, and many smelters are obtaining 5/ per ton more. Spelter quiet.

IRON.—"Ayresome" Yorkshire Pig Iron, prices from September to December inclusive, No. 1, 70/; No. 2, 65/; No. 3, 62/6; No. 4 (Foundry), 60/; net cash, or 1/ extra 4 months' bills. Scotch Pig, Warrants, 86/ to 87/. Staffordshire Bars, £10 to £12. Hoop Iron, £12 to £13. Gas Tubes, 62½ per cent.; Fittings, 67½ per cent. off list. Boiler Tubes, 30 to 35 per cent. discount.

COPPER.—English Tough Ingot, nominal, £84 to £85. Chili Bars, £75 to £76.

TIN.—English Ingot, nominal, £97 to £98. Straits, £96 to £96.

TIN PLATES.—Best Coke, I. C., nominal, 27/ to 34/; Charcoal, I. C., 35/ to 41/ per box.

LEAD.—Best English Soft Pig, £21. 10/. Refined Red Lead, £23 to £24.

ANTIMONY.—French Star, £49 to £51.

SPELTER.—Silesian, £22 to £22. 10/. English, £23.

SHEET ZINC.—£28. 10/; Perforated, 3¼d. per foot super 10 per cent.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, Aug. 2, 1874.—*Metals*—There is no change of note to be reported for the week. Business in the European metal markets has, on the whole, been quiet—partly owing to midsummer sluggishness and partly to the dry season, which has hampered manufacturing industry in a great many localities, both on the Continent and in England. While manufacturers have thus been going on slowly in the further accumulation of stock, the makers of Pig Iron, and of Metals in a raw state, have also produced comparatively little, and the rebound that is likely to take place during the fall months will be all the more vigorous and lasting, under the impulse, moreover, of bountiful harvests everywhere. The weather has been eminently propitious to the latter, and as money will in all likelihood remain tolerably easy, the outlook for autumn is a cheerful one, the more so as European politics are apparently without disquieting features. The discount rate at the European centers, though slightly enhanced at some points, remains a low one, and we can discern nothing to shake our belief in a good and profitable trade drawing near, and this with all the more reason, as there has been no speculative over-straining in metals during the entire summer thus far. *Copper*—The West Coast Charters for the fore part of July have been heavy—say, very nearly 2900 tons, against 1400 a year ago, causing a £1 decline in the London market. Our own Paris market has been closely following the London one, and from a better tendency, has relapsed into a weak one. We quote: Chili Bars, 207·50 francs, which is above the London parity; Common, 202·50; and Ingots, 220; Corocoro Ore, 205. Havre is inactive at 207·50 to 210. First brands—Current brands, 205; and Lota and Urmeneta, 202·50 the 100 kilos. Marseilles is well sustained on the basis of 220 for Chili Ingots. *Tin*—The Dutch sale of 22,058 slabs, averaging 56½ guilders, a general slight improvement has resulted therefrom in the European markets, and the previous weakness has undergone a favorable change, there having been more sold at the sale referred to than had been anticipated, and as available Banca is in but light supply, prices advanced ¼ guilder, subsequently, consumers buying quite freely. We have, nevertheless, been rather inactive here, and the market is but nominal at 260 francs for Banca, 255 Straits, and 248 English Refined, with a slight looking up toward the close. Tin is weak at Marseilles on the basis of 250 for Straits. *Lead* cannot be pronounced quite as firm as has previously been the case, yet there has been no downright giving way at any one point on the line. Thus Paris remains steady, French, here, at 53·50, and Spanish at Havre, 53. Marseilles is quiet and inactive at 54. *Spelter*.—This metal is devoid of animation, both in England and in this county, and is weaker here. Silesian and other good brands here and at Havre, 56·50 to 57 francs. Marseilles steady and unaltered. *Iron*.—The only thing of interest during the week have been the custom house returns of France on the subject of Pig Iron, showing a 24 per cent. falling off in our import trade in it, and we handled for export, also, 9 per cent. less, during the first half of the current year. There is a slightly improved feeling in France in view of the anomalous state of affairs in England, where another 10 per cent. reduction in wages seems to be impending, with the operatives evidently little inclined to subscribe to it. We are with Finished Iron at 240 francs here, and 220 at the Haute-Marne and the North. At a late opening of tenders, for Rails, for the State government railroads, the award was given to the firm tendering them at 245, against 230, the highest figure. Should orders continue to drop in at the same ratio, there is every reason to expect a brisk and healthy trade soon, with quite a margin to the maker and manufacturer. Blast furnaces are being rekindled on all hands, and in the Loire department, especially, the situation begins to improve. The favorable change has been wrought throughout France within the past eight days. All that remains to be hoped for is that politics may not step in and mar a prospect so encouraging. *Coal*.—Producers and consumers have at length arrived at a proper understanding as to the current value of the staple, now that the new campaign is drawing near. The imports of Coal and Coke into France during the first half of 1874 show a decrease of 300,000 tons. The new internal revenue tax upon goods by freight trains is discovered to produce much less than had been expected, although due to the paralyzation in general business.

BELGIUM.

(Le Commerce.)

BRUSSELS, Aug. 1, 1874.—*Iron*.—A general calm reigns just at present throughout the Iron region of Belgium. The work on hand is restricted to the filling of small orders, though sufficient in number to keep the works going, and to give them time to wait quietly for a better turn, likely to come, as is usually the case during the fall season. Finished Iron suffers most, while Sheet Iron and Rails are in increased good request. Architectural Iron is also wanted, with a good deal of activity for English account. A couple of weeks are likely to pass ere a more general revival will be noticed throughout Belgium. At a recent tender of Rolled Iron No. 3, the price taken was 21·90, against 24, the highest. Although Pig Iron is the reverse of active, a good many blast furnaces are being rekindled. The following are the current values of Iron: Wrought, 210 francs; Sheet, 280; "affinage" Pig, 8, and "moupage" ditto, 10·50. *Coal*.—The Coal companies have had good sense enough not to attempt a raising of price lists for to-day. We congratulate them upon this policy of moderation; the branches of Iron industry in Belgium still suffering could not well stand the additional burden of higher Coal. Our Coal market is now steady, with no tendency apparent in either direction. There has been a noteworthy decrease in the quantity of Coal shipped from the Belgian mines both by rail and water. Should production now be resumed in full, there will be time enough, till the campaign opens in good earnest, to accumulate some stock, and be ready to fill all orders promptly that may chance to come along. The only apprehension which again arises upon the occasion is that there may be the chronical lack of cars on the part of our State Railroad, so frequently referred to in vain.

GERMANY.

(Borsenhalle.)

HAMBURG, Aug. 2, 1874.—*Copper*.—Since the Brazilian cable has been in operation, the overland line across the Pampas and Cordilleras, between Buenos Ayres and Valparaiso and the one between Montevideo and Rio Grande, have been all brought to work in instantaneous conjunction, with a single break of little importance, enabling the Valparaiso people to communicate with Europe with but 24 hours between the extremes. The tendency of the telegraph has been to diminish the importance of actual stock on hand, inasmuch as further shipments to replenish it from a distance can be quickened by the instantaneous transmission of fresh commands, and steam aiding us, we can thus, within 60 days, have the Copper here after it is ordered. And as the United States have resumed their position of an export country of Copper, there cannot occur an actual dearth of it at any time henceforward, the two great Copper producing centers of America now being within easy reach of both the telegraph and steam. As regards the gambling in future delivery contracts, it will, on the other hand, be on the increase, since people in Europe can now daily share in these operations, both at New York and Valparaiso, and dealings on a vast scale, under this head, loom up in the distance. The Copper markets of Germany have been rather brisking up through the pressure of real consumptive wants, and great firmness is noticeable, without as yet resulting in any improvement. Stocks have been run down here to such a point that business is restricted thereby. Drontheim is 89 marks. We expect supplies of Lake Superior Copper. *Tin*, after considerable weakness, has, in consequence of the favorable turn in Holland, recovered to the figures of our last report here. *Lead* is doing well in Germany; Berlin is steady at 7⅛ to 7¼ thalers the 50 kilos. for Tarnowitz, Hartz and Saxonian; Stettin, Spanish, 8⅛ to 9; German, 7⅛ to 8. Here we are steady at 25 to 25¼ marks, German; English, 25. A thousand Pigs, Spanish, have gone in transit to the interior. *Spelter* is again firmer; Silesian at Berlin, 7⅛ to 8 thalers the 50 kilos.; at Stettin, 7⅛ to 8. Nothing transpiring there, where we are nominally 22 marks.

HOLLAND.

Koch & Vlierboom.

ROTTERDAM, Aug. 4, 1874.—*Tin*—On the 29th ult. there were sold by the Dutch Trading Society 22,058 slabs Banca, at their usual sales, at between 55⅝ and 57 guilders the 50 kilos, or be it 56⅜ on an average. Banca has since been done at 56 and 55¾; September, 56. Billiton, 54¾ to 54⅛.

STOCKS AND DELIVERIES OF TIN HELD AND MADE BY THE SOCIETY, JULY 31.

	1874.	1873.
Banca.	slabs.	slabs.
July deliveries	7,549	9,000
First seven months	76,172	81,119
Stock on Warrants	29,058	28,496
Unsold stock	122,385	125,628
Afloat, piculs	13,300	13,900
Billiton.		
July deliveries	none	none
First seven months	2,967	1,831
Stock on Warrants	200	100
Unsold	none	none
Stock in private hands	28,375	13,353

CHINA.

(Arnhold, Karberg & Co.)

CANTON, July 3, 1874.—*Metals*.—Lead has been dealt in to a moderate extent at previous currencies. Stocks are small and present rates likely to be maintained. Tin continues to attract some attention at present rates. *Quicksilver*—Native dealers, in view of the heavy supplies now close at hand, have almost withdrawn from the market, and but very few sales have taken place during the past fortnight at gradually declining prices. We quote: Lead, $6·90 to $7·20 per picul; Tin, $25·25 to $27·50; English Quicksilver, $185 to $185·50; and Californian, $187 to $188.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., Aug. 4, 1874.

THE IRON TRADE,

generally speaking, is not improving much, although I do not fail to note that in one or two localities there is a clearly defined step forward. In the North of England, for instance, there is a very good inquiry on Scottish account, and also a strong local demand for foundry pig iron, but these appear to be more strictly the results of a disturbed market, consequent upon the strikes, than from a really better state of trade. It is, consequently, very probable that when the greater part of the Scotch furnaces are again in blast (the colliers' strikes being now for the most part disposed of), and their output regular, as well as large, prices will come down somewhat both in Scotland and the Middlesboro' district. Middlesboro', as I have explained on former occasions, is the chief center of the comparatively new iron district of Cleveland, which, being in the extreme north of Yorkshire, is not very remote from Scotland, either by sea or rail. Hence, when Scotch pig iron goes up in too aerial a fashion, founders and others in that canny country resort to Middlesboro', where they can obtain a fairly good, common pig at very low rates—say 20/ per ton under the price of Eglinton or the East Coast brands. This is a temptation incapable of being resisted, the sequence going to show, as in this instance, that the Cleveland market often benefits by a rise in Scotch prices, whether the latter is brought about by speculation, limited production, or a large demand. So far as the Scotch pig iron market itself is concerned, I may here briefly state that it has been moderately firm at the rise, with a tolerably large demand. In the oldest iron making part of the country, South Staffordshire, some of the manufacturers are "laying the flattering unction to their souls" that a speedy recovery of trade may be expected. They are not able to put forward many cogent reasons for their belief, but allege that buyers are tired of waiting for the drop, and will presently place their orders in the market regardless of price. I do not myself altogether coincide with this opinion, but I shall not venture either to scoff at it or endeavor to refute it, being content to let time be the arbiter. My own idea is that no solid advantage can possibly be gained without lower prices.

The *Iron and Coal Trades Review* takes the following jubilant view of the situation:

"Rail buyers have evidently been holding back as long as possible, in the expectation of still lower prices. They are now showing considerable anxiety to place their orders before a marked rise takes place. Already the majority of manufacturers are fairly filled for the current navigation season, so that only a limited amount of work can be booked for the present. It is tolerably clear that not a few people who have been too keen about prices will be caught, and will have to pay rather heavily for what they may require before the end of September. Even the home railways have been holding back as long as possible. The Northeastern is now in the market for a large lot of new rails, which may be taken as an indication that the directors of that company do not anticipate any lower prices at present. It is stated that some heavy parcels of rails are now required on Russian and other accounts. From various quarters we hear of a large contemplated expenditure on new railway works. Five millions are to be spent in the Cape; considerable sums will be devoted to Indian railways; additional lines are wanted in several parts of South America. Portugal, Italy, Austria, Sweden, are all making new lines; America is again becoming able to finance successfully additional railway schemes; British North America has its Pacific route in view, so that there is every prospect of a brisk rail trade over the next few years. The recent depression has been mainly due to the high range of prices that had the effect of keeping back all new works and renewals. At rates something like those now prevailing, the work of railway construction will be continued with vigor. With respect to the other department of the heavy iron manufacture, that also is in a fairly promising condition. The iron shipbuilding trade promises to be active and flourishing. A large amount of new work is on hand, and numerous inquiries are being received for additional vessels. On the whole, then, we may regard the prospect of the iron trade with satisfaction. No particularly good results are to be anticipated for some time, but manufacturers may now look at all events to make both ends meet, and to be getting over the losing stage, through which too many establishments have been passing for some time."

WAGES AND THE PRICE OF IRON.

You are, of course, well aware that under the conditions whereby the boards of arbitration were formed and are conducted in the Northern and Southern iron districts, the rate of wages for puddling is fixed according to the average price of iron during the preceding three months. The gentleman who acts as arbiter, or accountant, in arriving at this scale of payment, has just made his report, which I quote here:

"Having collected and verified the returns of sales of manufactured iron by the firms and companies belonging to your board, during the three months ending the 31st ult., I certify the average net selling price per ton for that period to have been £10. 18/11¾. Annexed is a statement of the different classes of iron sold, and the average net selling price of each:

	Weight produced. Tons. cwt. qr. lb.	Percentage of Total.	Average net price per ton. £ s. d.
Rails	79,764 9 3 10	52·45	10 2 11·58
Plates	41,546 15 3 6	27·33	12 2 1·62
Bars	19,712 18 3 17	12·96	11 11 1·9
Angles	11,061 7 2 18	7·27	11 5 9·88
	152,085 12 0 23	100·00	10 18 11·78

"I am, gentlemen, your obedient servant,
"EDWIN WATERHOUSE."

Mr. Smith, the accountant for South Staffordshire, certifies that the average price of the twelve selected Staffordshire firms for the same period was £12. 17/1·62. The average price for the two districts is thus £11. 18/0·7, which gives 11/9 as the rate of puddling over the next three months, and mill and other rates 2½d. per cent. advance.

You will observe how largely the production of rails enters into the Cleveland and Northern industries, forming, in fact, more than half of the whole output.

SCOTCH PIG IRON MARKET.

This market has, on the whole, been fairly firm during the week just ended, and makers' brands have been firmly held, although warrants have declined a point. These are now quoted at 86/ per ton for cash. The determination of the masters to blow in a large number of furnaces caused much excitement in the ranks of the many speculators who maintain a constant skirmish with legitimate traders, and somewhat upset their calculations. They had perceived that the masters had been acting in concert in keeping the furnaces idle, and had fondly hoped that the policy of restriction would be adhered to, if not, indeed, extended. But, however greatly this class of gentlemen may have been disappointed, the great majority of the trade hail the blowing in of the furnaces not only as a present boon but as an index of a coming revival of trade. There will then remain only 20 out of blast. The manufactured iron trade is still very quiet in Scotland, notwithstanding the patient and persistent efforts of makers to attract orders by dropping prices. On the Clyde the shipbuilders are doing a moderately large business, chiefly on old orders.

Writing on Friday evening, July 31st, since which there has been no market at Glasgow, owing to the bank holiday, Messrs. Watson & Co. say: Our pig iron market has been firm during the past week with a fair business doing; warrants have fluctuated between 86/6 and 89/6, closing to-day at 87/, cash.

Shipments last week were 8483 tons, against 11,085 tons in the corresponding week of 1873. We quote:

	Deliverable alongside. No. 1.	No. 3.
G. M. B., at Glasgow	91/	87/
Gartsherrie, "	115/	90/
Coltness, "	117/6	...
Summerlee, "	112/6	89/
Langloan, "	115/	89/
Carnbroe, "	97/6	88/
Calder, at Port Dundas	115/	88/
Glengarnock, at Ardrossan	100/	88/
Eglinton, "	92/	88/
Dalmellington, "	90/	88/
Shotts, at Leith	110/	90/
Kinneil, at Bo'ness	92/6	8/

Freights continue almost unchanged, being: Glasgow to New York, 8/; Ardrossan, same; Glasgow and Ardrossan to Boston, 18/; East Coast, 12/6 to ditto; Glasgow and Ardrossan to New Orleans, 20/; East Coast to ditto, 9/; Glasgow and Ardrossan to Baltimore, 17/ and 17/6, respectively; East Coast to ditto, 14/.

THE WEST COAST AND CLEVELAND DISTRICTS.

At Barrow, pig iron of local make has again come down, current prices being "Maryport" hematite at Maryport, No 1, 95/; No. 2, 95/; No. 3, 95/; No. 4, 95/. Bessemer, No. 1, 100/; No. 2, 97/6; and No. 3, 95/. "Millom" hematite pig iron: Bessemer, No. 1, 95/; No. 2, 92/6; and No. 3, 90/; Ordinary No. 3, 90/; No. 4, 87/6; No. 5, 87/6; Mottled and White, 105/ per ton. Other descriptions are selling as low as £4. 5/. The steel works are still running on old orders, and are making good time; but there is, nevertheless, a large stock of pig on hand in some of the furnace yards. Four furnaces are out at Barrow, and one at Askham, while a new one is being erected at Carnforth. The iron shipbuilders are doing a good business on orders placed some time back. This also is the case with the yards on the Tees, Tyne and Wear. So far as the iron trade of Cleveland is directly concerned, I have little to add to what I have stated above. There is, certainly, a stronger pig iron market, but the rail trade has not yet responded, many of the mills being unable to keep going, owing to the absence of orders for that class of iron.

THE DANKS PUDDLER.

I notice that a correspondent of one of the London iron papers, in referring to the reported failure of Danks' puddling apparatus, makes these remarks:

"The great puddling controversy still goes on without any nearer approach toward a settlement. It is now admitted by most practical men that there is little hope of Danks' system becoming commercially successful until the mechanical defects under which it labors have been considerably modified, and the great bulk of our northern iron manufacturers are resting on their oars, content to continue the use of the old puddling furnace until some better form of furnace comes to the front. The Danks furnaces at the Carlton Works of the North of England Industrial Iron and Coal Company are being adapted to the Crampton principle, but I have good reason to know that there was a prospect of adopting the old form of reverberatory furnace, and discarding altogether the rotary principle. From this extreme measure the company were deterred by the fact that they have incurred great cost in laying down three-high rolls and other expensive machinery to work the Danks furnaces. A new forge, meanwhile, is being laid down near Eston on the system patented by Mr. Thomas, of the Acklam refinery, and as this system has never yet had a fair trial, its results will be regarded with interest."

At the same time I am dull enough not to comprehend what three-high rolls have got to do with a puddling furnace—whether Danks' or an ordinary one. Perhaps Mr. Lauth will explain!

TRADES OF SHEFFIELD.

The miners strike in South Yorkshire is now at an end, the men having gone to work at the drop of 10 per cent., leaving the other 2½ per cent. to arbitration. There is now no scarcity of fuel. The demand for house coal has for a couple of months been of the customary light summer nature, so that there has been little or no inducement for either colliery owners or merchants to advance prices to the consumer. An abundance of good house coal can be had at prices ranging from 11/ to 15/ per ton. Engine fuel and steam coal has also not been in strong request, owing to the dullness of the Sheffield trades and the moderate shipping demand. Prices are, therefore, unaltered.

Being thus relieved from the incubus of the miners' strike, manufacturers in every branch are beginning to calculate upon a further reduction in the price of fuel, so as to enable them to make a corresponding drop in their own quotations. Up to the time of posting this I have not heard of any such fall, although it is clearly most urgently needed, both in the interests of the coal owners themselves and the manufacturing community hereabouts. In many articles foreign competition still cuts very close, particularly in articles such as rails, axles, tires and wheels, whether made of iron or Bessemer steel. From one or other causes, either from a legitimate decrease in the demand or by reason of Belgian and German competition, it is certain that Bessemer material is not being produced so largely in this town and locality as was the case a few months back. Taking the cost of a ton of hematite pig (Cumberland) at £4. 15/ to £5, which are current figures, it is evident that after the cost of converting, hammering or rolling, &c., has been paid, there is no great profit on the ingots or billets at £9 to £10 per ton, or upon rails with further labor to pay at £10. 10/ to £11 per ton, delivered in either Liverpool or Hull. The same is, of course, applicable with other figures to iron. Russia, India, New Zealand, and to a less extent still, the United States, are taking a few steel rail lots, mostly on old orders, or on recently secured contracts, which leave but the veriest margin of profit. There are, it is to be admitted, a few concerns, such as John Brown & Co., the Elecar Works, and perhaps half a dozen others, which have a "pull" over their local competitors by the possession of their own collieries, iron mines and blast furnaces; still it is a sure indication of the quietude of trade when we find that even they are by no means busy, although the advantages just enumerated enable them to push a moderately good business in certain articles. The armor plate forges, mills and planing, &c., shops continue to be fairly although not fully occupied on plates and fort shields. These are, I understand, on account of the British, Austrian, German, French and Russian governments. For charcoal plates and ship plates of the quality in common use on the Clyde and other rivers there is a fairly good inquiry at prices which are somewhat differently quoted by the various makers. Files, saws, and edge tools do not sell very readily, neither is the market for engineering articles so generous as it was a short time since.

I am again unable to fish up any new fact of interest in connection with the cutlery trades. They remain extremely dull, and reporting upon them resembles fly-fishing all day without a single rise. I may, however, allude to a so-called "trade mark" case between Messrs. Penniman & Wiebusch, of New York, and Mr. Hill, of Sheffield, there being also a second suit between the same parties but with reversed positions. It was shown, in the Court of Chancery, that a certain trade mark, "Monumental" and "M. C. C.," had been obtained and registered by Mr. Hill. In 1868 Mr. Hill supplied Penniman & Wiebusch with goods bearing this mark, and paid them a salary for its sale. In the early part of this year a dispute arose as to the interpretation of the agreement between the parties, and recourse was had to the law courts, the result being to refer the matter to arbitration. The arbitrators had refused to make any award, and Mr. Hill now alleged that the parties were carrying on business with his mark. The defendants entered a cross suit, claiming that Mr. Hill was their servant, and that the mark was in fact theirs. After some argument the case was left over until the Michaelmas sittings of the court.

THE BIRMINGHAM AND STAFFORDSHIRE DISTRICTS.

In these localities there is a somewhat better inquiry for plates, angles, ties suitable for girders and roofing, and sheets. The pig iron trade is quiet, with some few slight indications of a better inquiry. Producers of marked bars and other high class iron assert that with the ruling high prices of fuel, dearness of raw materials and labor, present prices are but barely remunerative, and makers who turn out a commoner description of goods support the complaint, adding that they are even in a worse position. Merchants still profess that prices must come down, but the manufacturers, as might be expected, do not take the same view of the question, and predict an early upward movement in quotations. The Belgian agents are, as a sequence, securing numerous orders for common and second-class iron, although they have put prices up 10/ per ton in consequence of an improvement in the quality of the iron. After this advance they are still 30/ to £1 per ton below English figures, and may be expected to obtain many of the orders left to the option of merchants in placing. In Staffordshire good bars in almost any quantity can be had at about £10, or from that figure up to £11 for a slightly better class of iron. The chief firms demand £12 for bars and £13. 5/ to £14 for sheets. In the latter respect they are doing pretty well, stocks being low; yet, be it noted, the demand is not sufficient to find the workmen more than three or four days' work per week. The hardware industries are, summarily speaking, thus: brass foundry, chandeliers, hollow-ware, bedsteads, agricultural implements, tools, fine locks, edge tools and coach iron work—well employed; heavy iron goods, tubes and West Indian goods—dull. Tin plate and japanned goods only moderately active. Jewelery slack. The Cape market is furnishing good indents for leather goods, guns, wagon iron work, and a few Canadian buyers are at present in Birmingham making selections of goods for that market. India, Southern and Central America and Australia are also forwarding encouraging orders for the classes of goods above mentioned. The home trade is considered to be a little better.

SOUTH WALES

send us no news of any moment. Everything there is dull and depressed, no amelioration being deemed likely until further reductions are effected in wages. The steel works in the district are becoming slack, even Dowlais having few orders on hand in that department. The men appear likely to resist the further drop, but there can be no doubt whatever that they must give way after a very slight struggle, if they are foolish enough to commence one. Mr. Crawshay still keeps Cyrfarthfa idle, and the Belgians have carried off two good rail orders this week at £7. 2/6 in the very teeth of South Wales.

THE METAL MARKETS

have been quiet, and prices have, in some instances, gone back considerably. Von Dadelzen & North's report says: "*Copper* early in the week was very dull, and several parcels of Chili bars were forced off at £75. 10/, sharp cash. On Wednesday last the charters were telegraphed as 2000 tons, which increased the dullness. Yesterday, however, a large business was reported in bars, at an advance of 20/ per ton. Our closing prices are—bars, £76. 10/ to £77, with prompt; Wallaroo, sellers, £87. 10; Burra, £86. English dull. *Tin*.—Prior to the Banca sale, Straits changed hands at £94, cash, and Australian at £92. The 22,100 slabs Banca were all sold, at an average of 56½fl, equal to £98 laid down here. This gave strength to the market here, and Straits has been sold at £95. 10/ to £96; Australian, £93. 10/ to £94. English is also firmer. Common blocks, £97; bars £98. The market in Holland is firm. *Tin Plates*.—No change to report. The demand for charcoal is dull. Cokes move off more freely. *Lead* remains steady, at about £21. 5/ for good soft pig. *Spelter*.—No official business reported Prices remain nominal; Silician, £22. to £22 5/. *Quicksilver* has been advanced to £23 per bottle."

The *Mining Journal* thus reports: "*Copper*.—At the beginning of the week the market opened without animation, Chili bars, g.o.b., being quoted £76. 10/, but on Tuesday the Chili charters for the first fortnight of July were announced, and amounted to 3000 tons, 1600 tons of which are bars, and 1400 tons furnace material. The corresponding charters for last year did not exceed 1400 tons. The result of this telegram was still further to depress the market, and quotations were fractionally lower. A small amount of business was done in g.o.b. at £75, £76 and £75. 10/. The improvement in the amount of business contracted continued on Thursday, and altogether upward of 1000 tons of copper changed hands for Chili bars at £75. 10/ to £76. 10/, cash, and £77 three months; 100 tons of Lake Superior copper was reported, and have been sold, cost, freight, and insurance to Europe, at £82. 10/, net cash. To-day the market maintains its position. *Lead*.—The market is hardly so firm as it has been, although there is no decided change in quotations to report, good soft English pig being still quoted £21. 5/, and Spanish lead, without silver, £20. 15/. *Spelter*.—The market for this metal is entirely without animation, no transactions of any kind having been reported during the week. *Quicksilver* has advanced to £22 per flask, and is not obtainable in large quantities at the price. *Tin*.—For some time past this metal has been utterly lacking in animation, and during the week there has been no improvement to record. Actual business is confined within the narrowest limits, and prices are barely maintained. Straits tin has changed hands at £93. 10/ to £95 and £96; but no quantity would fetch the latter quotation. Insignificant parcels from two to five tons are dealt in, but no transactions of greater importance have been reported. Australian is quoted £93. 10/ to £94. English ingots, £96 to £97. *Tin Plates*.—The market remains steady and without alteration."

Messrs. French & Smith's London circular, July 30, runs as under: "*Copper*.—Advices from Valparaiso up to the 20th inst. state the charters since the 2d inst. as 3000 tons, upon which the market dropped, and Chili bars changed hands at £75. 10/. To-day, however, an important business has been transacted up to £77. Ore, 15/ per unit. Chili slabs, for 96 per cent., £77 to £79 per ton; Australian, Burra, £87; Wallaroo, £89. English, tough quality, £83 to £86; best selected, £85 to £88; sheets, sheathing, &c., £90 to £94; bottoms, rolled, £94 to £96; hammered, £106 per ton. Yellow metal, sheets, 4 by 4 feet, 8d. per lb.; sheathing and rods, 8d. per lb. *Tin*.—On the 20th instant 22,100 slabs Banca tin, offered at sale by the Dutch Trading Company, realized average price of 56½ fr., equal to £97. 10/ laid down here. The market here, both for foreign and English, has improved, and closes firm at our quotations: Banca, £98 per ton; Billiton, £94; Straits, fine, £95 to £98; Straits, afloat or forward, £95; Australian ingot, £93. 10/ to £94; English refined, £98; English, common bars, in barrels, £98; English, common blocks and ingots, £97 per ton. *Tin Plates*.—Charcoal, I. C., 36/ to 41/ per box; coke, I. C., 28/6 to 37/ per box."

Latest Liverpool iron prices are: Common bar iron, £9. 10/ to £9. 15/ per ton; Staffordshire do., £10. 5/ to £11; do. do., H and G, £10. 5/ to £11; do. best refined, £10. 15/ to £12. 10/; do. do., H and G, £10. 15/ to £13; do. horse shoeing iron, £12 to £14; do. do., superior quality, £14 to £15; do. nail rods, common, £10. 5/ to £10; do. do., best, £11. 5/ to £12; do. hoop iron, common, £11. 10/ to £12; do. do., best, £12 to £14; do. sheet iron, singles, £12. 10/ to £13. 10/; do. plates, ordinary, £11 to £12; do. do., best refined boiler, £12. 10/ to £15 per ton, all delivered free on board in Liverpool.

London Metal Market.

(From The Mining Journal.)

		£.	s.	d.	£.	s.	d.
Copper—₱ ton.							
Best Selected		85	0	0	87	0	0
Tough Cake & Tile		83	0	0	85	0	0
Sheathing and Sheets		90	0	0	92	0	0
Bolts		90	0	0	92	0	0
Bottoms		93	0	0	95	0	0
Old		90	0	0	95	0	0
Australian		86	0	0	88	0	0
Wire	₱ D.	0	1	0¾	—		
Tubes	"	0	1	0¾	0	1	1
Brass—₱ D.							
Sheets		0	0	10	0	0	11
Wire		0	0	10¼	0	0	11
Tubes		0	0	11	0	0	12
Yellow Metal Sheathing		0	0	7⅛	0	0	8⅛
Sheets		0	0	7⅛	—		
Spelter—₱ ton.							
Foreign on the spot		22	10	0	—		
" to arrive		22	7	6	—		
Zinc—₱ ton.							
In Sheets		28	10	0	28	15	0
Quicksilver—₱ bottle.		22	0	0	—		
Tin—₱ ton.							
English Blocks		97	0	0	98	0	0
Ditto Bars (in brls.)		98	0	0	99	0	0
Ditto Refined		100	0	0	—		
Banca		96	0	0	98	0	0
Straits		95	0	0	96	0	0
Australian		93	10	0	—		
***Tin Plates**—† ₱ box.							
IC Charcoal	1 qual.	1	15	0		nom.	
IX "	1 qual.	2	0	0		"	
IC "	2 qual.	1	15	0		"	
IX "	2 qual.	2	1	0		"	
IC Coke		1	8	0	1	10	0
IX "		1	14	0	1	16	0
Canada Plates	₱ ton.	19	0	0	—		
"	at works	18	10	0	—		
Iron—₱ ton.							
Bars Welsh, in London		9	5	0	9	10	0
"	to arrive	9	0	0	9	5	0
Nail Rods		11	0	0	—		
Nail Rods, Staff'd in L'ndon		11	0	0	—		
Bars		11	0	0	14	0	0
Hoops		12	0	0	15	0	0
Bars at Works		10	0	0	11	0	0
Hoops ditto		11	0	0	14	0	0
Sheets, single, and plates		13	0	0	15	0	0
Pig, No. 1, in Wales		5	0	0	6	10	0
Refined metal ditto		7	0	0	8	0	0
Bars, common ditto		8	10	0	—		
Do, merchant, Tyne or Tees		9	0	0	—		
Ditto, Railway, in Wales		7	0	0	8	0	0
Ditto, Swedish, in London		16	0	0	17	—	
To arrive		16	0	0	17	0	0
Pig, No. 1, in Clyde		3	15	0	4	5	0
Ditto, f.o.b., Tyne or Tees		4	0	0	5	0	0
Ditto, Nos. 3, 4, f.o.b.			—			—	
Railway Chairs		5	0	0	5	5	0
" Spikes		12	10	0	14	0	0
Indian Ch'coal Pigs in L'don		10	0	0	13	0	0
Steel—₱ ton.							
Swedish, in kegs (rolled)			—			—	
Ditto (hammered)		19	10	0		—	
Ditto, in faggots		21	0	0		—	
English, spring		23	0	0	25	0	0
Lead—₱ ton.							
English Pig, common		21	5	0	21	10	0
Ditto, LB		21	5	0			
Ditto, WB		21	15	0	22	0	0
Ditto, Sheet		22	10	0	—		
Ditto, Red Lead		23	0	0	—		
Ditto, White		30	0	0	32	0	0
Ditto, Patent Shot		25	0	0	25	10	0
Spanish		21	0	0	21	2	6

* At the works 1s. to 1s. 6d. per ton less. Terne plates 2s. per box below tin plates of similar brand.
† Add 6s. for each X.

The Value of Super Heated Blast in the Working of Blast Furnaces.

Translated from the German of Prof. Tunner by Mr. H. Rocholl.

Most metallurgists remember that on the first introduction of hot blast in the working of blast furnaces, the temperature of the same, taken at the tuyeres, amounted from only 150 degs. to 300 degs. C. (302 degs. to 572 degs. F.). Nevertheless, a saving of 15 to 30 per cent. and more of fuel was everywhere experienced, and the only objection against the use of heated blast was the circumstance that, in some instances, the saving of fuel was accompanied by a deterioration of the quality of the pig iron. Chemical analysis has proved a larger amount of silicon to be the cause of this pig iron being objected to. In all probability, this higher percentage of silicon results from the circumstance that heated blast produces a higher temperature, particularly of the lower part of the furnace, where the reduction of silicon takes place. The first and most natural means to diminish the temperature of the lower parts of the furnace, and to obtain conditions similar to those when using cold blast, was found in the increase of burden; but it appeared that this did not effect, in all cases, what was desired; in several instances a perfect reduction and the desired degree of carburization were not obtained. The limits of those conditions under which the pig iron is gray or white, seem to approach each other so closely that, for a long time, particularly in Inner Austria, metallurgists doubted whether heated blast could be advantageously used for a regular production of white iron. After a closer study of the blast furnace process, however, another remedy against an excessive formation of silicon was found, which did not impair the reduction and carburization of the metal; a more basic slag, obtained by an additional quantity of limestone, appeared to have a firmer hold of the silicon, and to prevent its entering largely into the pig iron. This expedient is employed successfully in all those cases in which the ore does not already contain an excess of lime, for, by the presence of a large excess of lime, sulphur enters into combination with this earthy base. In some few cases, a widening of the crucible, or lowering of the pressure of the blast, is found useful; these expedients, however, are applicable only within narrow limits prescribed by other conditions. In all those cases where an increased proportion of silicon is not objectional, but rather desired, the above named means of reducing its amount are of course not used, and the introduction of heated blast under such conditions was, from the beginning, followed by the greatest success.

At the present time, hot blast, in consequence of the saving of fuel it effects, is of so universal application, that only exceptionally a blast furnace worked with cold blast is met with; but another question recently has arisen and is discussed eagerly among scientific and practical metallurgists, viz., the highest temperature at which an increased heating of the blast would be accompanied by increased economy. In England, ever since Neilson, in 1827, introduced hot blast, a higher temperature has been worked with than in any other country. From England, particularly from the Cleveland district, recently has originated a considerable enlargement in cast iron hot blast stoves, as well as the introduction of Cowper's and Whitwell's stoves, by means of which iron smelters have been enabled to convey a blast of 500 degs. to 800 degs. C. (932 degs. to 1472 degs. F.) into the furnace. In the same district particular attention has been paid to a scientific investigation of the blast furnace process, most prominently by Mr. I. Lowthian Bell. In England, consequently, this question has originated, and there, most probably, will it first be decisively solved. This circumstance, however, does not exclude this matter from being again discussed in this place.

The majority of English metallurgists and iron smelters, according to the papers and discussions reported in the *Journal* of the Institution of Civil Engineers, pronounce the highest possible temperature of blast to be most economical, or at least they are of opinion that the limit beyond which increase of temperature does not increase economy has not yet been reached, still less exceeded. The other party, which believes that this limit has already been passed, at least in the Cleveland district, is headed by Mr. I. L. Bell, and for this reason their views call for closer criticism, as Mr. Bell recently has directed more attention and labor on the study of the blast furnace process than any other metallurgist.

A final settlement of this question is made more difficult by the circumstance that the consumption of fuel is influenced not only by the temperature to which the blast has been heated, i. e., by the quantity of heat which it conveys into the furnace, but also by the dimensions of the furnace, which determine the degree to which the heat, conveyed into and generated in the furnace is utilized. Not only the temperature of the blast, but, at the same time, the capacity of the furnaces has, of late years, been largely increased; consequently, it is difficult to make out for certain how much of the saving in fuel is due to the higher temperature of the air, and how much to the increased capacity of the furnace. If, beside, the material (ore and fuel) operated upon, or the quality of the pig iron, has changed, it will be still more difficult to assign to the increased temperature of blast its due share of the saving of fuel.

I shall begin by giving a short account of the opinions, investigations, and experiences, the publication of which has caused Mr. I. L. Bell to be acknowledged as one of the leading metallurgists of the present day.

Mr. Bell, in order to make out his case, assumes a blast furnace so large that the charge on going down may absorb the sensible heat of the gases, as well as saturate them with oxygen from the ore, as completely as is compatible with the nature of the blast furnace process. When in such a furnace the cold blast is changed for hot, say 485 degs. C. (905 degs. F.), it seems clear that, as far as intensity is concerned, the same should take place in a larger as in a smaller furnace, and the same extraordinary consequences should be looked for, if really they were depending on the increased intensity. This, however, is not the case, for if the furnace is so large that it affords the time required for finishing in proper time the two processes of reduction and smelting, a unit of heat, entering it by way of the blast cannot be more effective than a unit generated in the furnace itself by combustion of fuel.* According to Mr. Bell's view, it is therefore much simpler, and consequently more economical, to burn the whole of the fuel in the furnace itself with cold blast, instead of burning part of it in a stove, and heat the blast. In that case only, according to this theory, an advantage is to be gained by heating the blast, if it is done by a less valuable fuel which cannot be utilized in the furnace itself, *e. g.*, the furnace gases, or by impure and less expensive small coal, etc.†

This practically is the case, particularly as the furnace gases are universally used for the purpose; the question remains to be answered up to what extent the combustion of the expensive furnace fuel may economically be replaced by the heat of the blast.

The chemical laws according to which the power of CO of reducing oxides of iron diminishes in presence of CO_2, which acts as an oxidizing agent, establish a limit beyond which an increased temperature of blast is useless; with the increase of heat necessarily the proportion of CO increases, which is supplied by the combustion of fuel. Mr. Bell has shown by experiments that at 300° C (572° F.) a mixture of 100 vol. CO and 50 vol. CO_2 is indifferent to oxide of iron, as it occurs in calcined Cleveland ore, while the same quantity of CO mixed with 45 vol. CO_2 effects a partial reduction of the oxide of iron. This latter mixture, however, at 600° C (1112° F.) has no longer reducing but oxidizing properties.

Mr. Bell, in consideration that the chemical action of this mixture is only slow, and the temperature increases downward, assumes that a saturation of the gases with oxygen, to a degree corresponding to a mixture of 45 vol. CO_2 and 100 CO, does practically not take place, and he fixes for calcined Cleveland ore a proportion of 40 vol. CO_2 to 100 vol. CO as that at which no more oxygen is taken up. Mr. Bell calculates that for an ore which yields 40 per cent. and requires 15 cwt. of limestone per ton of pig iron, 93,000 calories are required per ton of p'g iron.

No. 1.—In the zone of fusion:		
Fusion of pig iron	6,600	
Do. of slag	17,000	
Decomposition of H_2O in blast	2,800	
Reduction of P_2O_5, SiO_2 and SO_3	4,000	
Expansion of blast	4,050	
Radiation from walls	450	
		34,900
No. 2.—In the zones of heated absorption, transmitted through the walls of the furnace	2,500	
No. 3.—In the zone of the decomposition of limestone:		
Expulsion of CO_2	5,550	
Decomposition of do	5,760	
		11,310
No. 4.—In the zone of reduction:		
Reduction of Fe_2O_3	33,100	
Carbon impregnation	1,440	
Evaporation of water in coke	300	
Radiation from walls	650	
		35,490
No. 5.—Carried off in gases		8,800
		93,000

To generate these 93,000 calories by cold blast at a proportion of 40 vols. CO_2 to 100 CO in the escaping gases, 35¼ cwt. of good Durham coke are required. Now, as this proportion of CO and CO_2, calculated from the amount of oxygen to be removed from the ore, requires only so much carbon as is contained in 21 to 21½ cwts. of coke, it follows that 4 out of these 25½ cwts. may be saved if the heat (represented by those 4 cwts. of coke) is conveyed into the furnace by way of the blast. This is accomplished by heating the latter to about 485° C. (905° F.) What, however, will be the result when the blast is introduced into the furnace at about 800° C. (1473° F.)? Evidently this additional heat will increase the temperature of the whole contents of the furnace, and on reaching the zone of reduction, will enable the CO_2, which was inert at the lower temperature, to take up carbon in the now increased temperature.

This gasification of carbon in the zone of reduction, and consequent diminution of the quantity arriving in the zone of combustion, will again lower the temperature of these two zones, and, finally, as the excess of heat conveyed into the furnace increases, the proportion of CO_2 in the furnace gases will decrease. Mr. Bell always has found proof of these reactions in his investigations on the subject, and he shows, from the results of a furnace at the Barrow Iron Works, and some furnaces of the Middlesbrough district, that the highly heated blast from Whitwell stoves, compared with blast heated to only 450° or 500° C. (842° to 932° F.), did not effect any further economy of fuel.

Mr. Bell admits brick (Whitwell) stoves to possess considerable advantages over cast iron ones, but for sufficiently large furnaces he does not put any value on their power of giving constantly a temperature of 500° C. (932° F.), simply because such a high temperature is useless. If, however, the particular nature of certain ores or fuel necessitates the use of small furnaces, the more highly heated blast proves a valuable help. The power of the blast furnace gases of taking up oxygen reaches, according to Mr. Bell, its limit when 30 per cent. of the CO are transformed into CO_2. Consequently, when this proportion is reached, further economy ceases, as they have no further reducing power.

From Mr. Bell's lengthened experience, it appears that a furnace 80 feet high, and of a capacity of 12,000 to 16,000 cubic feet, has all the advantages which can be gained by increasing its size; furnaces of a capacity up to 41,000 cubic feet, which lately have been erected in the North of England, have not realized corresponding advantages. According to Mr. Bell, in a furnace of 16,000 cubic feet, the limit is reached to which the waste gases may be cooled and saturated with oxygen; nor does the production of pig iron keep pace with the increasing size of the furnaces, as is evident from the following data:

Cubic capacity of furnace, in cubic feet	6,000	12,000	16,000	26,000	41,000
Weekly production, in tons	220	260	350	400	550
Weekly production, per 1000 cubic feet, in tons	37	23	22	16	13

I mention one more statement which Mr. Bell has experimentally proved. As the quantity of heat carried away by the waste gases is represented, even with the largest furnaces, by 2 to 3 cwts. of coke per ton of pig iron, Mr. Bell, in order to gain a better insight into the circumstances affecting the temperature of the upper part of the furnace—termed by him the zone of reduction—has made the following experiment: He replaced in a regularly working furnace the burden of a calcined iron stone by an equal weight of slag and flints, a mixture perfectly neutral to CO, and continued this mode of charging for many hours. The result was an immediate fall in the temperature of the gases, and subsequent rise as soon as calcined ironstone was again charged. This experiment seems to prove that, in contradiction to the usually adopted assumption, a development of heat takes place in the reduction of oxide of iron.

As the work of the blast furnace consists not only in the smelting of the charge, but, at the same time, or rather previously, in the reduction of the oxide of iron and immediate carburization of the iron produced, it is clear that for the performance of these processes a certain weight of fuel is necessary. Now, if it be universally correct that the power of the blast furnace gases of taking up oxygen, without simultaneously re-oxidizing reduced iron, ceased as soon as they contained 40 vol. of CO_2 on 100 of CO; furthermore, if in the large furnace the reduction of the ore really be completed at a temperature of 400° to 500° C. (752° to 932° F.), nothing could be said, in my opinion, against Mr. I. L. Bell's theory and calculations, at least as far as it concerns the production of white iron. But a much larger proportion of CO_2 exists in the gases from our furnaces which smelt easily reducible ores by means of charcoal, as is shown in Messrs. R. Richter and R. Shœffell's analyses published in this journal (Berg-und Huettenmaennisches Jahrbuch), and the reduction is completed at a much higher temperature, below the boshes, as well as in our furnaces, according to Professor Kupelwieser and Schœffell's and my own observations, as in the Swedish charcoal furnaces, as shown by M. Rinman. This latter statement that the reduction is completed at a higher temperature of 800° to 1000° C. (1472° to 1832° F.) is corroborated by Dr. C. W. Siemens, at least for the denser kinds of iron ore, *e. g.*, magnetic ore. Mr. Bell himself, in his several publications on this subject, has repeatedly stated that his calculations in the first instance refer only to Cleveland iron ore. Under these circumstances the discussion of the economical value of super-heated blast does not seem a superfluous one, notwithstanding Mr. Bell's most valuable work on the subject.

I first will try to show by calculation that the proportion of CO_2 to CO in the waste gases of our furnaces must be considerably higher than 40 vol. of the former to 100 of the latter, corroborating Messrs. Richter and Shœffell's analyses, the correctness of which from some sides has been doubted.

Adopting Mr. Bell's mode of computation, calculate the quantity of heat absolutely necessary for the production of 1 ton of white pig iron in the Inner-Austrian charcoal furnaces as follows:

	Units.
1. Evaporation of water in charcoal	400
2. Reduction of ore and carbon impregnation	32,400
3. Decomposition of moisture in blast	1,600
4. Heating and fusion of pig iron (Rinman)	6,800
5. Do. of 14 cwts. slag (Rinman)	6,160
6. Reduction of silicon and other impurities	1,000
7. Transmission of heat through walls of furnace and heating of tuyere water (Bell)	3,840
8. Heat in waste gases, escaping at a temperature of 300° C. (572° F.)	6,600
	58,800*

This quantity of heat is generated, the furnace working regularly and with a blast of 300° C. (572° F.), by a charge of 14 cwts. of charcoal, containing about 12·6 cwts. of pure carbon. After deducting ·9 cwts., as the quantity taken up per ton of pig iron, there remains available for combustion 11·7 cwts. of carbon.

	Units.
This quantity on burning to CO yields 11·7 × 248 =	29,016
60 cwts. of blast of 300° C. yields ·237 × 60 × 300 =	4,266
Total	33,282
The required quantity was	58,800
Leaving to be supplied by combustion of CO to CO_2	25,518

In order to generate this heat $\frac{25518}{2400} = 10{\cdot}64$ cwts. of CO have to be burnt to CO_2. Now the above 11·7 cwts. produce 27·30 CO, so that after deducting 10·64 there remain unchanged 16·66 cwts. CO. Consequently, in order to generate 58,800 units, 16·66 CO and $10{\cdot}64 \times \frac{22}{14} = 16{\cdot}72$ CO_2 (or by volume 64 CO on 100 CO) have to be formed. Herr Schoffel found, in 1871,* 58·3 CO_2 on 100 CO; Herr Richter's analysis of 1859 shows even more CO_2 than CO. We certainly may conclude that the proportion of 40 CO_2 to 100 CO, on which Mr. Bell's calculations are based, cannot be universally accepted as true.

If, as Mr. Bell assumes, the reduction of oxide of iron be effected only by CO, and the whole of the iron brought into the furnace in the state of Fe_2O_3, the reduction of 19 cwts. of iron would require 14·2 cwts. of CO and produce 22·2 CO_2 while, according to the above calculation, the generation of the necessary heat requires only the formation of 16·72 CO_2. If, in the process of reduction, 22·2 cwts. of CO_2 were formed, the weight of CO remaining, at a consumption of 14 cwts. of charcoal, would be only 13·1 cwts., consequently, 108 vols. CO_2 on 100 CO would result, a proportion which, by the late Prof. Richter, has actually been shown to exist in the gases from the Wabun furnace at Eisenerz.

However doubtful it may seem, after more recent investigations, whether such a large proportion of CO ever does occur in furnace gases, certainly there can be no doubt that in the working of our blast furnaces for white iron, under the conditions on which the above calculations are based, the reduction of the ore demands the formation of a larger quantity of CO_2 than the generation of the heat required for the smelting necessitates, and consequently that, in accordance with Mr. Bell's theory, a higher temperature of the blast cannot be accompanied by a greater saving of fuel. It seems a vain endeavor exactly to fix the highest temperature at which, in our production of white iron, the heating of the blast is accompanied by a corresponding saving of fuel; the doubt which still exists about the conditions under which the reduction of the oxides of iron takes place, does not allow the assumption of incontestible bases for calculation; however, so much seems almost certain, that at a temperture of 300° C. (572° F.), the limit is not only reached, but most probably passed. Thus the erection of the more expensive hot blast stoves (large cast iron ones, or Whitwell's), for our blast furnaces in the production of white iron is only so far of advantage as the temperature of the blast, which can be regulated at will, and raised very high, affords a convenient means of regulating the work of the furnace.† Very different, however, are the conditions under which gray iron is produced in Inner Austria blast furnaces, respecting which, since the introduction of the manufacture of the deep gray Bessemer iron, several valuable observations have been made.

In Neuberg formerly, at a temperature of blast of 200° C. (392° F.) and a yield of 44 to 45 per cent. of pig iron, 15·4 to 15·6 cwts. of charcoal were used per ton of white iron, and 23 to 24 cwts. per ton of gray iron, *i. e.*, 50 per cent. more fuel was consumed for the production of gray Bessemer iron than was used for white. Lately, by heating the blast to about 500° C. for the production of Bessemer iron, the consumption has been reduced to 19 to 20 cwts., a saving of more than 25 per cent. against the weight required at a lower temperature. In the Carinthian blast furnaces at Loelling, Treibach and Heft, many years since, only 12·6 to 14 cwts. of charcoal were used per ton of white pig iron, at a temperature of blast of 160° to 200° C. (320° to to 392° F.) and a yield of 50 to 54 per cent. At Treibach, a further economy of fuel on using hotter blast has been asserted, but afterward doubted; only so much is certain that the quality of the white iron produced at a temperature of blast of 500° C. (932° F.) has been by all consumers objected to, and its production has been accompanied by many irregularities. For the production of gray Bessemer iron of first-rate quality, however, at Heft, the consumption of charcoal has been reduced from 20 cwts. and more at 200° C. (392° F.) to 17 to 18 cwts. at 350° to 400° C. (662° to 752° F.)

It seems certain that at Treibach, when with the use of highly heated blast the burden was considerably augmented, in order to avoid the formation of gray iron, a perfect reduction did not take place, in consequence of which, what is called a boiling slag (Kochschlacke) formed in the crucible of the furnace. In consequence of the boiling the pig iron grew porous, intermixed with slag, though still of a grayish character, owing to the high temperature at the tuyeres. At Heft and Neuberg, however, in the production of gray iron with a consumption of 17 to 20 cwts. of charcoal, even at a high temperature of the blast, the quantity of CO required for complete reduction is present in sufficient quantity.‡

This difference in the value of super-heated blast for the production of white and gray iron, not at all entered into by Mr. Bell, is of particular importance for our easily fusible, mostly manganiferous ores; for in smelting these ores the difference in the consumption of fuel for the one or the other quality is considerable, and, even in the most favorable case, the quantity of charcoal required is so large that a deficiency of carbonic oxide is not to be feared.

I believe, in consideration of these facts concerning our charcoal furnaces, that in the smelting of easily reducible ores with charcoal the proportion of CO_2 to CO may reach 60 vols. CO_2 to 100 CO. If in the production of white iron at a temperature of blast of 200° to 300° C. (392° to 572° F.) the quantity of CO_2 in the waste gases does not come up to these proportions, then greater economy may be expected from a higher temperature of blast, without impairing the quality of the pig iron. A deterioration of the same will in any case be owing rather to a cold working of the furnace than to an increased reduction of silicon, which latter is easily prevented by the means enumerated above.

The considerable advantage of highly heated blast for the production of Bessemer iron, above referred to, and proved by the results obtained at Neuberg and Heft, is owing, I believe, not only to the higher consumption of carbon generating an excess of carbonic oxide, which is required for this quality of iron, but no less to the circumstance that in using highly heated blast, the temperature of the upper part of the furnace is relatively lower, and of the lower parts higher than is the case with cold or moderately heated blast. Though I must own that I have not succeeded in proving the increased intensity of highly heated blast in experiments which I performed in the laboratory of the Mining Academy, at Leoben, with the assistance of Prof. Kupelwiser and Schœffell, so much, however, is certain, that on using heated blast (unmixed with the gases of combustion from the stove), a higher temperature must exist in the lower part of the furnace than with cold blast, because, in the first case, the same quantity of gas, and equally the temperature of the upper part of the furnace must be lower, because, with the smaller quantity of gas and increased burden, the absorption of heat must be quicker and more complete. This is proved by the frequently observed fact that in using hot blast, the lower parts of the furnace are more rapidly eaten away than with cold blast. This distribution of the heat is a necessary condition for the production of gray iron, which, when cold blast is used, can only be gained by a greatly increased consumption of fuel.

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* Nothing can be said against this; on the contrary, the general abandoning of Cabriol's hot blast stove confirms this view. Quite different, however, are the conditions when the blast introduces only the heat, not the products of combustion, from the stove into the furnace.

† The advantage to be gained by the more perfect combustion obtainable in stoves compared with the combustion in the blast furnace (which yields more CO_2) cannot be of much consequence, it being counterbalanced by the considerable amount of heat escaping in the waste gases of the stoves and lost by radiation between the stove and the tuyeres. More important is the convenience which changing the temperature of the blast affords for quickly regulating the working of the furnace.

* This figure is more likely too low than too high, the absorption of heat by expansion of the blast not being taken into account. The quantity of this certainly amounts to more than the heat, which, as Mr. Bell has proved, is generated in the reduction of the ore, and which has been neglected in this calculation.

* Berg und Huettenmaennisches Jahrbuch of 1873, p. 188.

† I must confess that formerly I have put too much trust in several communications which I received as to the saving of fuel, consequent on the use of highly heated blast in the production of white iron. The charge of charcoal being universally measured by volume, I have lately had made exact determinations of the weights of many charges by some of my younger fellow-workers, and so found inaccuracies in several of my former figures.

‡ I would not by any means dissuade smelters from constructing larger hot blasts (cast iron or brick) stoves for our furnaces, which at present are worked for white iron. Such stoves, beside being periodically useful for regulating the working of the furnace, are certainly of greater durability; beside, the demand for Bessemer iron increases annually, and undoubtedly in a short time our iron ores, being so exceedingly poor in phosporus, will be universally smelted for Bessemer iron, so that the production of white iron, now almost universally practised, will be the exception.

A Lost Race.—Wonderful Discoveries on the Northern Shores of Lake Superior.

A correspondent—whose statement has since been verified—writing from one of the mining settlements on the shores of Lake Superior, says that the remains of a considerable number of ancient copper mines have lately been discovered on Isle Royale, Thunder Bay, on the northern border of the lake, which exhibit undoubted evidence of having been worked by a race of men long since extinct, and of whom we possess no knowledge save that left behind by such traces as are now being brought to view. Shafts of considerable depth, filled and choked with the accumulated debris of ages, have been opened, and in penetrating to a depth of sixty feet, tools of wonderful workmanship have been discovered, together with charcoal remains, which mark the point where skilled artisans formed, from copper, tools whose temper and durability would astonish the ingenious makers of the present day. Hammers and chisels seem to have been the principal implements for working the mine, which, together with the fire, reduced the ore to a condition which rendered its removal in detail easily accomplished. Finely tempered knife blades have been picked out of the pit, and granite hammers of such a size as to require the strength of no ordinary man to wield successfully.

These discoveries, wonderful as they are, do not stand alone, nor do they present any new facts in relation to the people who formerly inhabited this Continent. They simply go to strengthen the evidence that, centuries before the written history of America, powerful and civilized communities occupied every portion of its domain, who, disappearing, left behind them proofs of their progress in the arts and sciences, and their indubitable skill in architecture. For three thousand miles along the valleys of our great Western rivers traces of towns and cities occur at intervals, together with the remains of large fortified encampments, which show, from their position and arrangement, that their builders were no mean adepts in the art of warfare. Vast tumuli, with dead buried in a sitting posture, and at their feet shells unknown to this Continent, exist by the hundred in the Ohio and Mississippi valleys. In the dense Yucatan forests there are ruins of temples and palaces, resembling in solidity of construction, massiveness of materials, general design and execution, the ancient remains of the old Egyptian dynasties. Yet neither in Western America nor in Yucatan exists the faintest tradition as to that mysterious race which has left behind it the imperishable record of its genius and civilization. We can do nothing but conjecture. Pursue our investigations as we may, we are still led back to the starting point, with no more definite knowledge than we set out with. The thread is lost, never to be recovered.

It is a singular fact that, thus far, there has never been discovered any of the ruins, or in connection with the tools and war implements mentioned, any mark, letter or trace whereon any clue, either to the origin, customs, or language of this mysterious race, might be caught or gathered up. In Europe the gradual process of development from a half savage state to the high culture of the present day, may be traced, stage by stage, and every distant era marked by a definite date. But here the links that bound one generation to another have been abruptly severed, and the mound builders of the Ohio, the architects of Copan and Palenque, and the copper workers on the shores of Lake Superior alike lie beyond the reach of the historian and speculations of the archæologist. The relics they have left behind them only serve to excite the conjectures of the curious and the investigations of the scientific. Possibly, in some yet undiscovered ruin or tomb, the key may be found to the problem which now puzzles the world; but then it is only a possibility. There is little doubt that the mystery will remain until the great day when the sea gives up its dead and the past be stretched before us like a scroll.

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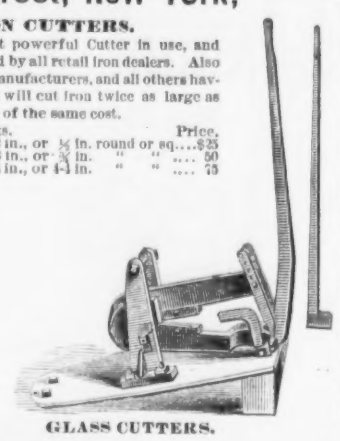

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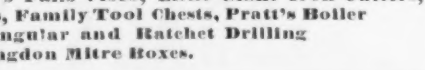

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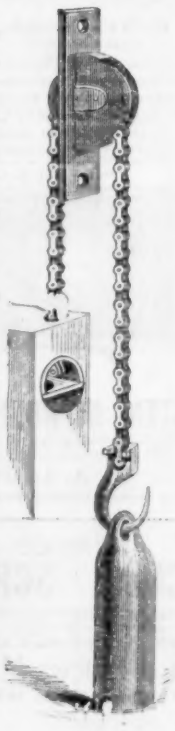

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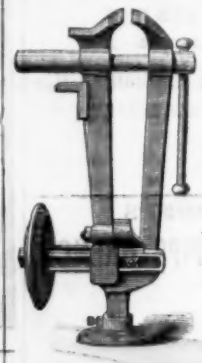

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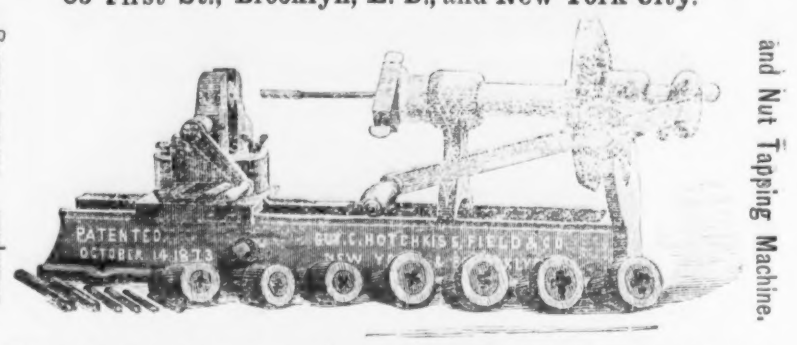

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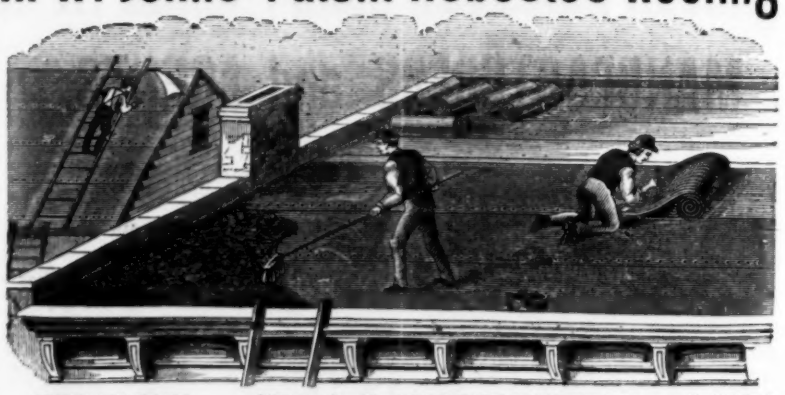

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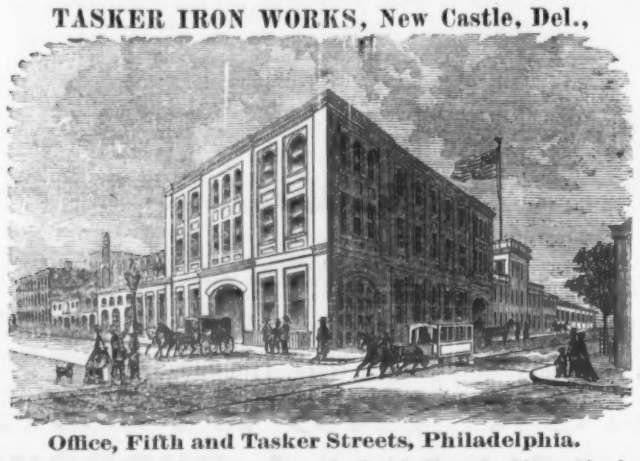

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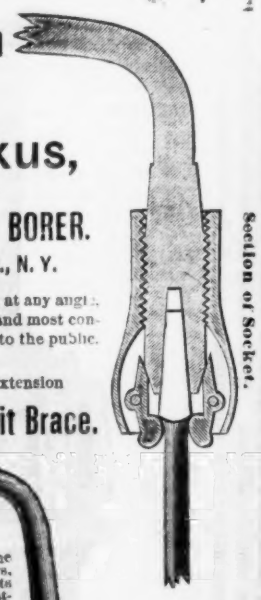

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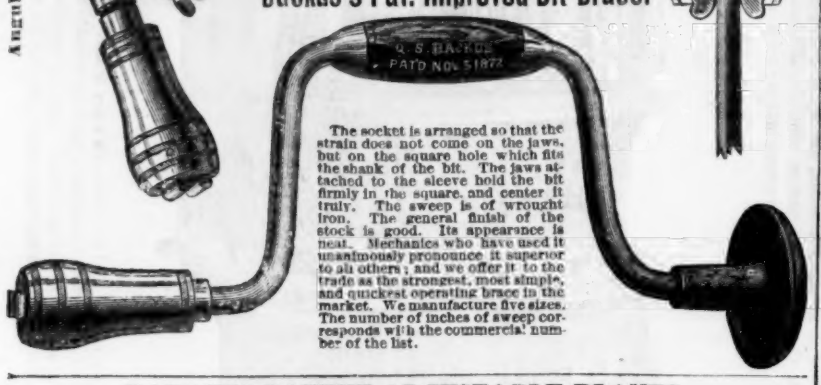

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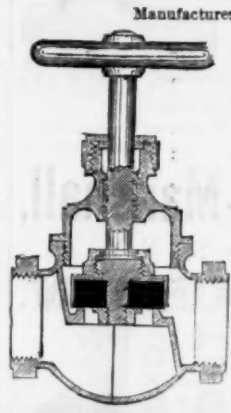

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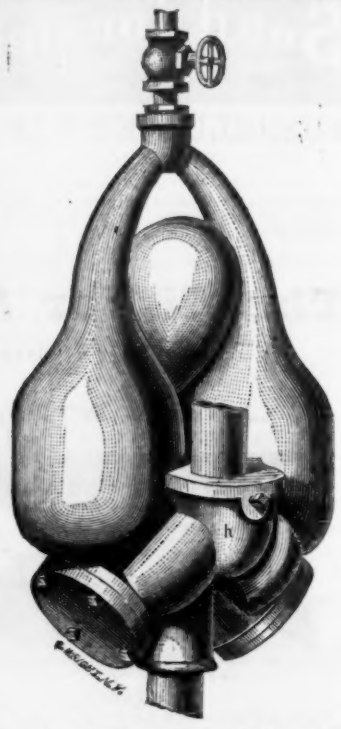

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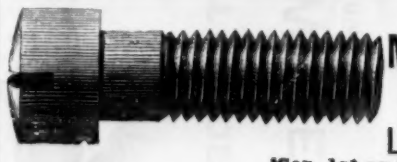

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Rowland Wm. & Harvey, 943 Beach, Phila..... 36

Note Broker.
Gallaudet P. W., 3 and 5 Wall, N. Y..... 2

Nuts, Bolts, etc., *Makers of*
American Bolt Co., 210 Lawrence, Lowell, Mass..... 13
Arms, Bell & Co., Youngstown, O..... 12
Carpenter David, 402 Water N. Y..... 4
Clark Bros. & Co., Millidale, Conn..... 12
Fuller, Lord & Co., Boonton, N. J..... 4
Haskell W. H. & Co., Pawtucket, R. I..... 12
Old Colony Rivet Works, 116 Chambers, N. Y..... 12
Roseberry Geo. D., Pottsville, Pa..... 4
Russell, Birdsall & Ward, Port Chester, N. Y..... 36
Plumb, Burdict & Barnard, Buffalo, N. Y..... 36
Sternbergh J. H., Reading, Pa..... 12
Union Nut Co., 78 Beekman N. Y..... 27

Oilers. *Makers of.*
Austin J. & Co., 168 Fulton, N. Y..... 12

Old Iron, etc.
Gregg H. L. & Co., 108 Walnut, Philadelphia..... 5

Ore Crushers.
Blake Crusher Co., New Haven, Ct..... 34

Paints.
Rocky Mountain Vermillion Paint Co., Prov., R. I.. 8

Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y.

Patent Solicitors.
Brieson A. V., 258 Broadway, N. Y..... 15
Howson & Son, Phila. and Washington, D. C..... 14
Whitney J. A., 128 Broadway, N. Y..... 18

Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y..... 3

Pipes, Fittings, etc., *Makers of.*
Eaton & Cole, 53 John, N. Y..... 22
McNab & Harlin Mfg. Co., 56 John, N. Y..... 22
Nelson, Finker & Co., 439 E. 10th st., N. Y..... 22
Pancoast & Manle, 227 Pear, Phila..... 22
Chas. Gregg Mfg. Co., 62 and 64 Gold, N. Y..... 22

Pipe, Water and Gas, *Makers of.*
Brick R. A. & Co., 112 Leonard, N. Y..... 6
Graff William & Co., Pittsburgh, Pa..... 22
McNeal John & Sons, Burlington, N. J..... 6
Morris, Tasker & Co., 15 Gold, N. Y..... 22
National Tube Works Co., 78 William, N. Y..... 22
Starr Jesse W. & Sons, Camden, N. J..... 6
Warren Foundry & Mach. Co., Phillipsburg, N. J.... 22
Wood R. D. & Co., 178 Broadway, N. Y..... 2

Piston Packing.
Canfield John & Co., 121 Fairmount Ave., Phila..... 20

Plane Irons. *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Conn..... 6
Middletown Tool Co., Middletown, Conn..... 8
Sandusky Tool Co., Sandusky, O..... 20

Planes, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Conn..... 6
Greenfield Tool Co., Greenfield, Mass..... 21
Ohio Tool Co., Columbus, O..... 9
Stanley Rule & Level Co., 35 Chambers, N. Y..... 22

Plated Ware
Rogers & Bro., 208 Broadway..... 24

Plumbago Lubricator.
N. Y. Black Lead Works, 172 Forsyth, N. Y..... 6

Plumbers' Materials, *Manufacturers of*
Carr Wm. S. & Co., 106 Centre, N. Y..... 22

Portable and Stationary Forges
Kellogg Wm. P. & Co., 121 Chambers N. Y..... 34
Keystone Portable Forge Co., 120 Exchange place, Philadelphia..... 6
Manning H. S. & Co., 111 Liberty, N. Y..... 6

Presses, Power. *Makers of.*
Am. Saw Co., Trenton, N. J..... 36
The Stiles & Parker Press Co., Middletown, Ct..... 34

Pressure Blowers. *Makers of.*
Sturtevant B. F., 72 Sudbury, Boston..... 35

Pumps, *Makers of.*
Burlingham & Purdy, 105 Chambers St..... 7
Douglas W. & B., Middletown, Conn..... 7
Rumsey & Co., Seneca Falls, N. Y..... 7
Union Mfg. Co., 99 Chambers, N. Y..... 7
Valley Mch. Co., Easthampton, Mass..... 7

Pyrometers.
Brown Edward, 311 Walnut, Phila.

Railroad and Miners' Tools.
Hogan, Clark & Sleeper, Boston..... 9

Rails, *Importers of.*
Congreve Chas. & Son, 104 and 106 John, N. Y..... 32
Smith Gilead A. & Co., 62 Broadway, N. Y..... 4

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa..... 6
Cambria Iron Co., Johnstown, Pa..... 5
Cleveland Rolling Mill Co., Cleveland, O..... 6
Griswold John A. & Co., Troy, N. Y..... 32
Milwaukee Iron Co., Milwaukee, Wis..... 6

Razor Straps, *Makers of,*
B. F. Badger, Charlestown, Mass..... 6

Refrigerators,
Lesley Alex. M., 224 W. 23d, N. Y..... 36

Rivets,
Old Colony Rivet Works, 116 Chambers, N. Y..... 12
Timmes Peter, 231 North 6th, Brooklyn, E. D..... 4

Rolling Mill Machinery, etc., *Manufacturers of.*
Birmingham Iron Foundry, Birmingham, Ct..... 4
Moore James, Cor. 16th and Buttonwood, Phila..... 34

Rolls, Chilled and Sand, *Makers of.*
Garrison A. & Co., Pittsburgh, Pa..... 4

Rules, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Ct..... 6
Stanley Rule and Level Co., 35 Chambers St..... 22

Sash Chain,
Thomas Morton, 15 Murray, N. Y..... 21

Saws, *Makers of.*
Atkins E. C. & Co., Indianapolis, Ind..... 10
American Saw Co., Trenton, N. J..... 10
Boynton E. M., 80 Beekman, N. Y..... 10
Flint J., Rochester, N. Y..... 10
Disston Henry & Sons, Phila..... 25
McNeice Wm., 515 Cherry, Phila..... 10
James Ohlen, Columbus, O..... 10
Peace Harvey W., Williamsburg, N. Y..... 10
Spear & Jackson, 116 Duane, N. Y..... 29
Wheeler, Madden & Clemson, Middletown, N. Y..... 10

Saw Frames, Wood, *Makers of.*
Boynton E. M. 80 Beekman, N. Y..... 10
Peace Harvey W., Williamsburg, N. Y..... 10

Scales, *Manufacturers of.*
Richie Bros., 9th near Coates, Phila..... 8
Shattuck W. F. & Co., 113 Chambers, N. Y..... 7

Screws, *Makers of.*
American Screw Co., Providence, R. I..... 13
Miles F. S., 205 Quarry, Phila..... 12

Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y..... 5
Field Alfred & Co., 47 John, N. Y..... 24
Gueutal George & Son, 39 W. 4th, N. Y..... 10

Shovels, &c.
Birmingham Shovel Co., 31 Chambers, N. Y..... 9
Clement & Hawkes Mfg. Co., Northampton, Mass.... 24

Skates.
Graham & Haines, 88 Chambers, N. Y..... 8

Smelting Works.
Reeves Paul S., 760 South Broad St., Phila..... 36
Du Plaine & Co., 1330 Callowhill, Phila..... 31

Stamped and Japanned Tin Ware.
Scheidler Jos. & Co., 88 Beekman, N. Y..... 6
Shepard Sidney & Co., Buffalo, N. Y..... 27

Steam Hammers, etc., *Makers of.*
Dudgeon Richard, 24 Columbia, N. Y..... 35

Snap, Harness *Makers of.*
Middletown Tool Co., Middletown, Conn..... 29

Spiegel.
Quincy John W., 98 William, N. Y..... 2

Squares, Steel and Iron, *Makers of.*
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y..... 9

Steam Pumps, etc., *Manufacturers of.*
Carr A. 43 Cortlandt, N. Y..... 29
Guild & Garrison, Williamsburgh, N. Y..... 31
Hall C. Henry & Co., 29 Cortlandt, N. Y..... 22
Philadelphia Hydraulic Works, Evelina street, east of Third street, Phila..... 35
Steele & Condict, 88 Liberty, N. Y..... 29

Steam Traps.
Alonzo L. Jones, 150 S. 4th, Phila..... 22

Steel Castings.
The McHaffie Steel Castings Co., Evelina and Levant Streets, Philadelphia..... 16

Steel Importers.
Carr J. & Riley, 82 John, N. Y..... 32
Cocker Bros., Sheffield, England..... 32
Congreve Chas. & Son, 104 and 106 John, N. Y..... 32
Hobson Francis & Son, 97 John, N. Y..... 32
Jessop Wm. & Sons, 91 and 93 John, N. Y..... 32
Moss F. W., 80 John, N. Y..... 32
Piersons & Co., 24 Broadway, N. Y..... 4
Sanderson Bros. & Co., 16 Cliff, N. Y..... 32
Sanderson Geo. & Co., 97 John, N. Y..... 32
Van Wart & McCoy, 43 Chambers, N. Y..... 33
Wardlow S. & C., 16 Gold, N. Y..... 32
W. Hawksworth, Ellison & Co., 80 John, N. Y..... 32

Steel Manufacturers.
Anderson & Woods, Pittsburgh..... 33
Chrome Steel Co., Brooklyn, E. D..... 32
Cleveland Rolling Mill Co., Cleveland, O..... 6
Gautier D. G. & Co., Jersey City, N. J..... 32
Griswold John A. & Co., Troy, N. Y..... 32
Hussey, Wells & Co., Pittsburgh..... 32
Miller, Barr & Parkin, Pittsburgh..... 32
Reiter, Sutton & Co., Pittsburgh, Pa..... 33
Reese, Graff & Woods, Pittsburgh..... 33
Rowland Wm. & Harvey, Frankford Phila..... 36
Singer, Nimick & Co., Pittsburgh..... 33

Stone Crushing Machines.
Blake Crusher Co., New Haven, Ct..... 9

Stoves.
Burdett, Smith & Co., Troy, N. Y..... 21

Stove Boards, *Manufacturers of.*
Shepard Sidney & Co., Buffalo, N. Y..... 27

Stove Polish, *Makers of.*
"Gem" Stove Polish, 172 Forsyth, N. Y..... 35

Twist Drills, *Makers of.*
Morse Twist Drill & Mach. Co., N. Bedford, Mass.... 31

Tackle Blocks, *Makers of.*
Burr & Co., 31 Peck Slip N. Y..... 31

Tacks.
American Tack Co., 117 Chambers, N. Y..... 13
Field A. & Sons, Taunton, Mass..... 9
Grundy & Kenworthy, 165 Greenwich, N. Y..... 32
Dunbar, Hobart & Whidden, S. Abington, Mass..... 32
Loring Samuel, Plymouth, Mass..... 32

Tea Trays. *Importers of.*
Dickinson Henry, 66 and 68 Reade, N. Y..... 11

Tube Expanders.
Dudgeon Richard, 24 Columbia, N. Y..... 34

Valves, Gas, Water and Steam.
Ludlow Valve Mfg. Co., N. Y..... 35

Vises.
Backus Vise Co., 78 Beekman, N. Y..... 18
Fisher & Norris, Trenton, N. J..... 18
Harrisburgh Foundry & Mch. Co., Harrisburgh, Pa... 21
Merrill Chas. & Sons, 256 Grand, N. Y..... 14
Howard Iron Works, Buffalo, N. Y..... 21
Trenton Vise & Tool Works, 101 & 103 Duane, N. Y.. 21
Wilson Mfg. Co., 37 Chambers N. Y..... 12

Water Filters.
Jewett John C. & Sons, Buffalo, N. Y..... 21

Water Meters.
National Meter Co., 95 John, N. Y..... 23

Welding Compounds.
Schierloh H., 21 Exchange Place, Jersey City, N. J... 3

White Lead, *Manufacturers of*
Brooklyn White Lead Co., 89 Maiden Lane, N. Y... 28
Colgate Robert & Co., 287 Pearl, N. Y..... 28
Jewett John & Sons, 182 Front, N. Y..... 28
Lewis John T. & Bros., 231 S. Front, Phila., Pa..... 28
Wetherill & Bro., 31st, below Chestnut, Phila..... 28

Wire, *Manufacturers of.*
Gilbert, Bennett & Co., 273 Pearl, N. Y..... 2
Prentiss Geo. W. & Co., Holyoke, Mass..... 4
Townsend W. P. & Co., Pittsburgh, Pa..... 4
Washburn & Moen Mfg. Co., Worcester, Mass..... 2

Wire Goods. *Manufacturers of.*
Gilbert

How Fires may Originate in Unsuspected Causes.

A writer in *Engineering* makes the following interesting compilation of facts relating to the origin of fires in unsuspected causes:

In the second volume of the *Builder*, in the number for September 28, 1844, it is stated on the authority of Professor Buckland that two churches in Italy had been a short time previous set on fire through an accumulation of guano in the towers occasioning spontaneous combustion. In 1851 a fire occurred in High street, Manchester, through the spontaneous ignition of oiled measuring tapes, which had not been in the warehouse twenty-four hours.

In the Worcestershire *Chronicle* for October 19, 1845, it was stated that a fire occurred at Mr. Philbroke's residence, Mill street, Worcester, at 2 p. m., in a bedroom with a southern aspect. There was a carafe full of water upon a table which concentrated the sun's rays to a focus on two embroidered mats; they ignited, but the smell alarmed the inmates and led to discovery before further damage was done.

Mr. Stansfield, cashier of the Royal Insurance Company, was present at Messrs. Dodd's warehouse, Lower Mosley street, Manchester, on a summer morning, in 1856, when a gas globe reflector concentrated the sun's rays and set fire to a gentleman's cravat, which was hanging on a line in the warehouse. Colored bottles in chemists' shops have often acted in a similar way as burning glasses. Cracks and starred glass in windows, as well as what we call "bull's eyes" and knots, have also frequently fired fuses, matches, and other inflammable things in tobacco shops. There is no doubt that fires have originated in cotton mills, fibre and waste warehouses, and other places, from the sun's rays being concentrated in various ways.

In 1857, Mr. Tozer, the present superintendent of the Manchester Fire Brigade, was in Turkey, in charge of the fire engines and general arrangements for the British government, when he received instructions from Sir Henry Storks—the general in command—by request of the Sultan, to investigate and report upon the origin of a fire which destroyed the Sultan's kiosk at Kulalee, in Asia Minor. The building was on the top of a high hill, and no one had entered the premises for at least three months, and during the whole of that time there had been a military guard night and day around the place. In August the sentry noticed a flickering flame issuing through a defect in the roof; the guard was turned out, and they forced an entrance into the building, but were unable to get to the roof. No fires or lights of any sort of description had been used within a considerable distance of the place, so that the communication of fire from without could not be accounted for. Mr. Tozer believed that the fire was caused by the rays of the sun having been concentrated upon the head of a nail in the timber of the roof, which had become exposed through a defect in the tiles, or else by the spontaneous combustion of an accumulation of guano from a number of pigeons which were around the ruins. This Mr. Tozer considered as a most interesting investigation under all the circumstances. Mr. Tozer also attended to a fire at the Sultan of Turkey's palace at Scutari, in 1856, occasioned by rats gnawing lucifer matches. They had gathered a quantity, and carried them under the flooring, where he found several after the fire that showed clear evidence of having been gnawed. A few similar instances have been traced at fires in London, as well as an instance of a jackdaw setting fire to a building by pecking lucifer matches until they struck fire.

Rats and mice have been known to carry quantities of oily waste and deposit it under flooring, where the accumulation has ignited by spontaneous combustion. Two instances occurred at Messrs. Phillips' warehouse in Church street, Manchester—one in 1851, another in 1866—of damage by fire occurring through rats gnawing holes in gas pipes. Cats and dogs have occasioned fires in various ways, such as upsetting inflammable things into fires or lights, and knocking down detonating powders and other explosive materials. Also, by lying inside fenders and such places where hot cinders, &c., have fallen upon them and adhered to their coats, causing them to beat a hasty retreat, and being anxious to get rid of the painful annoyance as soon as possible, they naturally rub themselves against anything at hand, or roll themselves on carpets, curtains, bedding, straw, or any other material, thereby transferring the cause of irritation to something that ultimately breaks out into a blaze.

That mischievous animal, the monkey, has also lent his aid to the devouring element in this way as well as others; in one instance by mischievously upsetting a brazier of charcoal, in another by pulling down a quantity of clothes drying in front of a fire, and by various other plans involving the use of hands, which are not possessed by any other animal except man.

Persons seized with fits have caused fires through falling with lights in their hands or into fires. One instance from this cause happened in Fleet street, London, in 1859, to a fireman. He had been a fireman forty years, and was left in charge of premises which had been damaged by fire, when the poor fellow, being unfortunately seized with a fit, fell into the fire and was burned to death. His clothes and body burning set the building again on fire, and led to his being discovered. We could also cite several cases of aged persons being burned and setting premises on fire through want of power to act and infirmity of body and mind.

In the year 1850 a fire occurred in Paddington through an iron sash-weight conducting the heat from a furnace to timber, which set a wash-house on fire.

In 1860 a cart loaded with hay was burned in Tooley street, London, through being set on fire by knocking against a public gas lamp.

In 1864 a high wind blew down a stack of chimneys at a carpenter's workshop, in Hulme, Manchester, which scattered some wood burning in the fireplace, amongst shavings, and destroyed the premises.

It may appear strange, but it is nevertheless true, that heavy rains and high tides have found work for the firemen both on board ships and barges, and in buildings. Rain, for instance, has often slaked lime, causing it to heat in contact with inflammable materials, and high tides have many times floated things to exposed lights. As an example, the Beswick Cotton Mill, Manchester, was seriously damaged by fire in 1864 through the river flooding the basement, when a quantity of cotton floating on the water came in contact with some gas jets which had been left burning, and thus set the place on fire.

In 1865 a fire occurred at a wax and tallow chandler's in Oxford street, Manchester, through a shower of rain. The water passed through a defect in the roof, and accumulated in the ceiling over the shop until its weight caused the ceiling to fall, pieces of which, striking upon a quantity of wax and other matches which were on the counter, caused them to ignite by percussion, and set the stock on fire.

For fear that we might be mistaken for endeavoring to emulate Baron Munchausen in the narrative of wonderful events, we will here cease the description of incidents that have occurred, and resume our analysis of the special risks from which they might occur.

BUSINESS.	USUAL CAUSES OF FIRE.
Churches, including places of worship of all denominations. Also meeting houses and lecture rooms of all descriptions.	Hot air, hot water and steam pipes, and furnaces and stoves. Sticking candles against coffins in vaults. Christmas and other decorations around or too near gas fittings, fires, or lights. Sparks falling upon birds' nests in spires and belfries.
Curriers, tanners, and workers in leather and hides of all descriptions.	Lime slaked by rain. Sparks from foul flues and furnaces passing through opening and projecting eaves of drying rooms. Friction of machinery in bark mills. Timber, coals, shavings of wood, and leather too near flues. Drying stoves and furnaces. Spontaneous ignition. Smoking in bark and other rooms.
Drapers, tailors, milliners, mercers, makers up and vendors of male and female attire of all descriptions.	Working late, being tired and falling asleep or becoming careless too near fires and lights. Unprotected and swinging gas brackets. Crinolines coming in contact with fire in open fire places. Light pendent goods being blown by the opening and shutting of doors or by concussions or draughts into unprotected lights. Goods hung on lines increase the risk in various ways, such as conveying the flame from one end of a room to the other, and when the line breaks down making three separate fires—one at each end and one in the middle at the same time—thus originating three distinct fires for each line. Cuttings left carelessly about. Using lights while intoxicated, especially by tailors' work people. Ironing stoves, hot plates, smoothing irons, &c., too near and sometimes on timber and goods. Smoking tobacco and matches for lighting it.
Engineering works and workers in metal of all descriptions.	Sparks from striking hot metal. Hot metal castings, &c., left too near timber. Heat from furnaces, forges, and smiths' hearths and flues. Friction of machinery. Japanners' stoves overheated or defective. Accidents with melted or hot metal. Explosions of blast furnaces. Spontaneous ignition of oily waste, molders, lamps, and other blacks; sawdust, or sweepings, and oil; spontaneous heating of iron turnings, &c., when mixed with water and oil.
Farming stock, stables, hay, grain, or flour stores, of all descriptions.	Stacking hay whilst green. Sparks from passing locomotives, &c. Sparks from steam thrashing machines. Sticking candles against walls and timber in barns and stables. Vagrants smoking in stables. Vagrants being refused alms. Fire-arms used near farming stocks, such as hay-stacks, &c.
Gunpowder, firework, lucifer match, and other manufacturers, and all workers in and makers up of explosive compounds.	Over-heating of drying stoves and explosive mixtures. Dropping lucifers. Unprotected lights. Smoking. Leaving phosphorus uncovered with water. Friction and percussion from nails in boots. Sparks passing through broken windows. The sun's rays being concentrated through bull's eyes, knots, &c., in glass. Defective casks containing gunpowder or other explosive materials. Spontaneous ignition of red fire and such like compositions. Carelessness in the supervision of young children employed. Shavings and chips too near fires and lights.
Gas works.	Hot coke near timber, &c. Seeking for an escape with unprotected lights. Timber too near furnaces, retorts, &c. Lime slaked by rain. Defective fittings and appliances. Spontaneous ignition of coals.
Hat manufactures.	Boiling shellac. Hot irons left on timber and other inflammable things. Defective drying and other stoves. Smoking tobacco.

A Six Months' Retrospect of the British Iron Trade.

The London *Money Market Review* says:

We confess we cannot view with so much complacency, as appears to have been done in certain quarters, the record of our staple industry during the first half of the current year. It will be remembered that, upon the opening of the year, we expressed our inability to comprehend the ground upon which were based such sanguine anticipations of prosperous times, although we acknowledged that we saw no real reason for alarm, but, on the contrary, every reason why holders of iron trade stocks should retain them. The statistics of the past six months amply bear out what we then said, and perhaps, in view of the general depreciation of the shares of some of our best joint-stock companies, it may be as well, in giving a *resume* of our trade for the half year just closed, to point out what in them inclines us to regard the future, if not exactly the immediate future, of the British iron trade with confidence. Great efforts seem to have been made, for various reasons, to throw the market into a state of alarm, and the few failures that have taken place, and to which we alluded on their occurrence, were not calculated to impart stability to business. Then we were expected to be greatly disturbed by the Belgium "bogey"; but it may be safely said that less confusion was created by this apparition than by the still more formidable appearance of American competition. Neither the one nor the other had the desired effect, for in a short time the bombast of our trans-Atlantic brethren ended in complete collapse, and the trumpeters of Belgian capacity and audacity have recently had humbly to confess that the producing power of that little hive of industry is by no means sufficient to make any very appreciable difference to us. The object sought to be attained by these alarmists was chiefly submission to lower wages by the artisans employed in different branches of the trade; but another effect has followed the adoption of these means. The investing public have bought shy of the shares of iron companies, and the result is that many of them, which, notwithstanding the generally depressed condition of trade, should stand much higher, can be dealt in at a very considerable discount.

The total quantity of iron and steel exported during the six months just ended amounts to 1,171,720 tons, as against 1,532,067 tons in the corresponding period of the previous year, and 1,674,708 in the same period of 1872. The value of the quantity exported during this period was this year £15,785,842, in 1873, £19,167,086, and in 1872 £16,006,626. Going more into detail, we find that this grand total is composed of 319,898 tons of pig iron, value £1,661,387, as compared with 634,745 tons, value £4,009,741, same time last year, and 677,384 tons, value £2,961,287, in the first half of 1872; 114,486 tons of bar, angle, bolt and rod, value £1,472,500, as against 150,305 tons, value £1,939,595, in 1873, and 160,552 tons, value £1,672,673, in the first half of 1872; 427,267 tons of Railroad iron of all sorts, value £5,494,764, as compared with 347,757 tons, value £4,586,877, in the corresponding period of last year, and 448,042 tons, value £4,376,433, in the first half of 1872; 68,809 tons of hoops, sheets, boiler and armor plates, value £1,295,757, as compared with 108,440 tons, value £1,937,721, in the corresponding period of last year, and 96,491 tons, value £1,407,072, in the first half of 1872; and 129,652 tons of cast or wrought and all other manufactures (except ordnance, unenumerated), value £2,553,421, as compared with 140,664 tons, value £2,710,120, in the same time last year, and 129,042 tons, value £2,108,357, in the first half of 1872.

These form the principal items of the grand total, as given above, and it must be borne in mind that the figures have begun to compare now with a period in last year in which the exports did not compare favorably with the same period of the previous year—that is to say, when in some of the principal items a deficiency was apparent as compared with 1872; so that we may now make a fairer and more reliable comparison with the work done in 1873, than it was possible to do earlier. And, when we do this, it will be seen that, as we have already intimated, there is not so much reason for a complacent regard of the returns as has been expressed in some quarters. To begin with pig iron we find that the decrease, as compared with the first half of last year, is over 314,000 tons, while the deficiency last year, as compared with 1872, was but 42,640 tons. Passing on to bar, angle, bolt and rod, we find a deficiency of 35,820 tons, as compared with the first half of 1873, while the difference between this latter period and the same of 1872 was but a little over 10,000 tons. Taking next hoops, sheets, and boiler and armor plates, a deficiency is observable, as compared with this time last year, of 39,631 tons, while the figures on that occasion showed an increased over 1872 equal to nearly 12,000 tons. With regard to cast or wrought, we find a deficiency of 11,000 tons, as compared with the first half of 1873, while that period showed an increase of 11,600 tons over 1872; so that, during the first half of this year, we have done a business in this item, very nearly corresponding to that of the same time in 1872.

The item remaining to be considered is the most important of all—viz., railroad iron of all sorts. The figures for the half year just closed exhibit a considerable increase over the first half of 1873, amounting, indeed, to 79,510 tons, which compares with a decrease when the first half of 1873 is compared with the same period of 1872, amounting to over 100,000 tons. It is chiefly from the fact of this large increase that we are led to have confidence in the future of the trade, and upon this we ground our advice to holders of iron trade stock to continue to hold.

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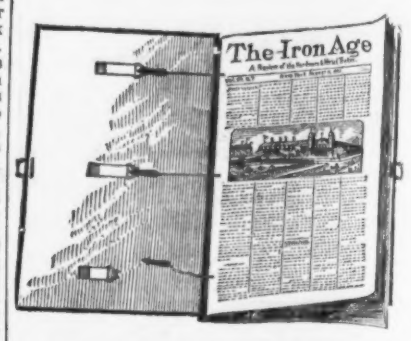

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Half Cloth.....$1·00 each.
(Cloth Back and Corners, with Morocco Paper Sides—a good, serviceable Binder.)

Full Cloth..... 1·50 "
(Morocco Cloth Back and Sides.)

Half Roan..... 1·75 "
(Roan Back; Cloth Sides.)

Half Morocco..... 2·00 "
(Morocco Back and Corners; Cloth Sides.)

The above are all in black, which is the most serviceable color, with the exception of the Half Morocco, which are put up in a number of handsome shades. The name of the paper is stamped in gold on either side, and each Binder is furnished with loops by which it can be hung up against the wall as newspaper files are usually disposed of.

The Binders will each hold the twenty-six numbers in the form of a bound volume. They can be nicely inserted in two or three minutes by any boy of ordinary intelligence; and when the covers are full they can be either preserved in that shape as bound volumes of *The Iron Age*, or they can be emptied and used again. There is no possibility of their getting out of order, unless the cords, which are very strong, wear out, when anyone can easily replace them with a piece of fishing line or other suitable string. Subscribers who value the paper should order them at once, so as to keep the paper in good order

On receipt of the price we will ship them, safely put up, by any express line or to any New York house to be packed. They are too large to be sent by mail.

ROGERS & BRO.,

MANUFACTURERS OF THE

Celebrated Silver Plated Goods,

FORKS, SPOONS, HOLLOWWARE, &c.,

STAMPED

"ROGERS & BRO. A 1,"

which they are now offering at greatly reduced prices.

Price Lists and Discounts mailed on receipt of business card or reference. Address

P. O. Box 320. 203 Broadway, New York.

Elmira Nobles Mfg. Co.,

Manufacturers of

"WATROUS" SHIP & CARPENTERS' AUGERS,

Adjustable Handled Drawing Knives, Axes, &c.

ELMIRA, N. Y.

WM. B. BEMENT & SON,

INDUSTRIAL WORKS, Philadelphia, Pa.

MANUFACTURERS OF

MACHINISTS' TOOLS

Of all descriptions.

STEAM HAMMERS a specialty.

HENRY DISSTON & SONS,

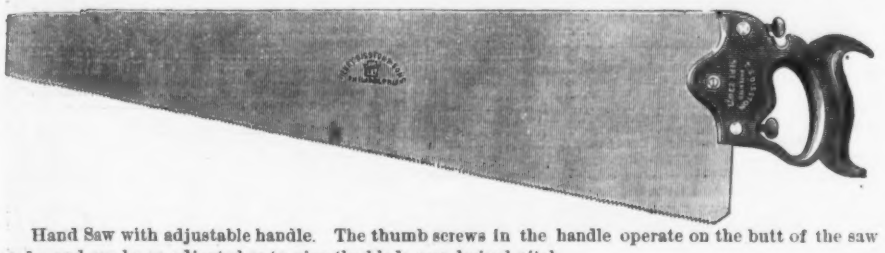
Keystone Saw, Tool, Steel and File Works,

PHILADELPHIA.

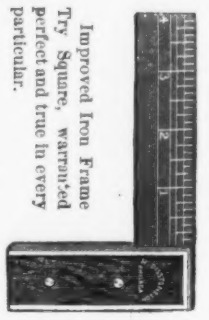
Manufacturers of SHEET STEEL, and all Articles made from Sheet Steel.

SAWS OF EVERY DESCRIPTION.

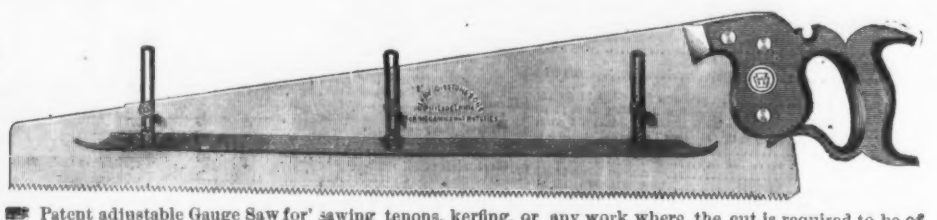
Also, FILES, TOOLS, Etc., and all kinds of Labor Saving Implements for keeping Saws in perfect order.



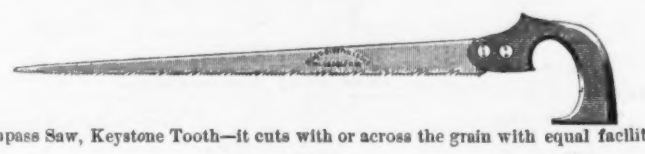
Hand Saw with adjustable handle. The thumb screws in the handle operate on the butt of the saw blade, and can be so adjusted as to give the blade any desired pitch.



Improved Iron Frame Try Square, warranted perfect and true in every particular.



Patent adjustable Gauge Saw for sawing tenons, kerfing, or any work where the cut is required to be of definite depth. Will pay for itself in one day. Try it and be convinced. Remove the gauge and use as an ordinary saw.



Compass Saw, Keystone Tooth—it cuts with or across the grain with equal facility.

Hack Saw. The blade in this Saw is reversible, an advantage which will be readily appreciated by mechanics.

READ, MARK, LEARN.

We guarantee our Cross-Cut Saws to do more work, day in and day out, the season through, than any other saw in the market.

The test of practical experience has been ap-

plied, the verdict given, the fiat has gone forth, and the Humbugs are fast fizzling out, while our rapidly increasing sales testify to the esti-

mation in which these saws are held.

We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

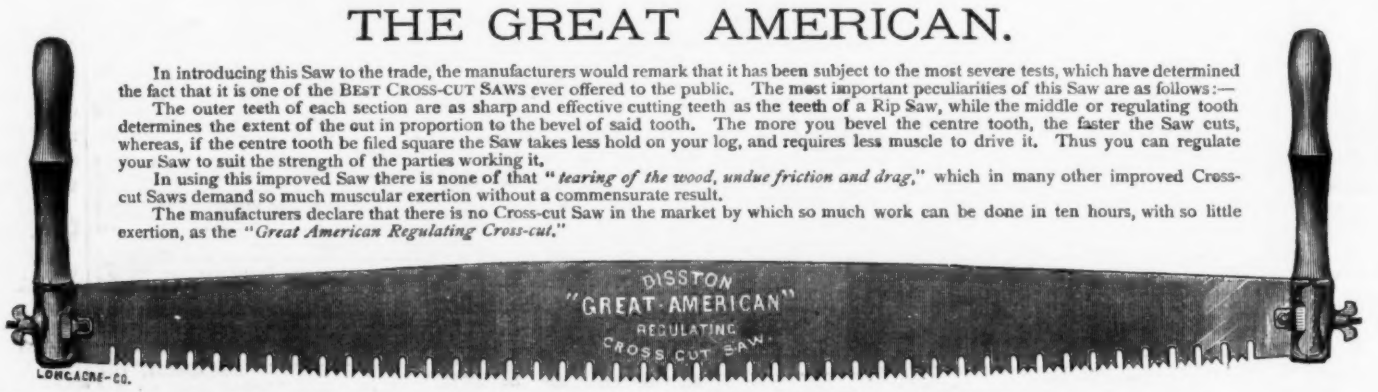
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag*," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

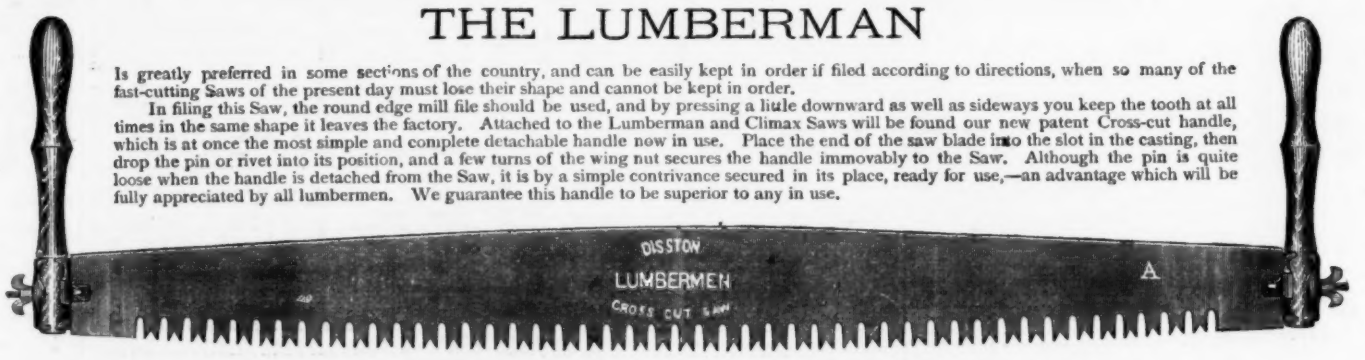
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"



THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

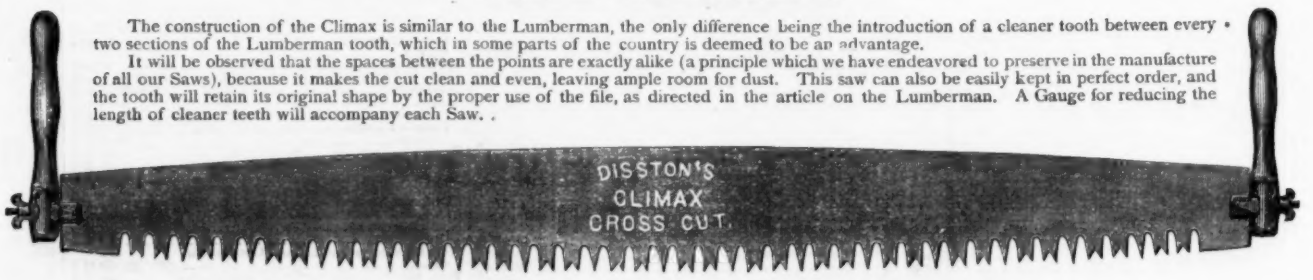
In filing this Saw, the round edge mill file should be used, and by pressing a litule downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

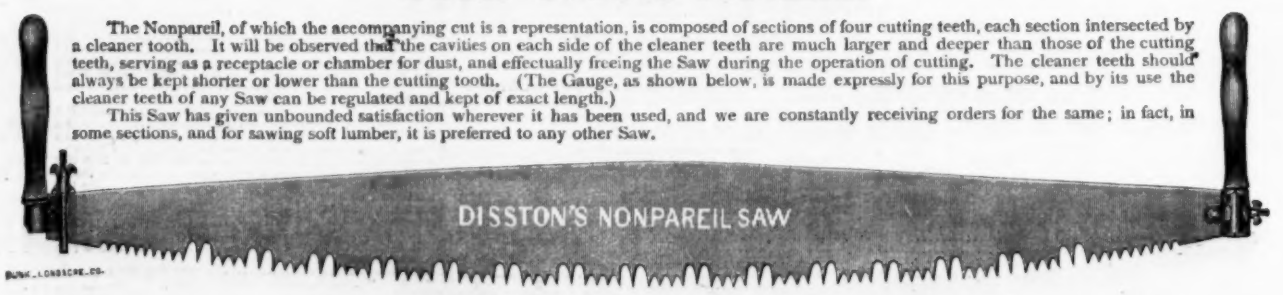
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



Plain Truths for Practical Men.

We guarantee our Cross-Cut Saws to do more work, day in and day out, the season through, than any other saw in the market.

The test of practical experience has been ap-

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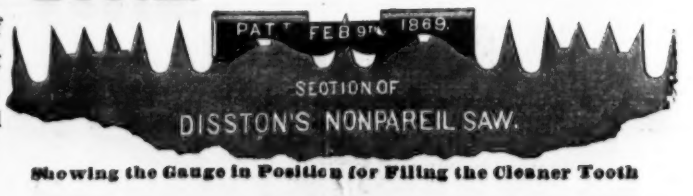
timation in which these saws are held.

We pledge ourselves that no effort shall be wanting to keep up the standard and reputation of our manufactures.

Gauge for Regulating Cleaning Teeth.

The cleaning teeth of all saws should be somewhat shorter than the cutting teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the cutting teeth, the cleaning teeth projecting through the opening in centre of Gauge. Reduce the projecting points, by means of a file, until arrested by the edges of the Gauge, which is made of hardened steel. Thus tooth after tooth can be rapidly and correctly reduced to an even length by any unskilled operator



Showing the Gauge in Position for Filing the Cleaner Tooth

New York Wholesale Prices, August 19, 1874.

HARDWARE.

Anvils.
Solid Cast Steel.....₱ ℔ 14c
Wright's.....₱ ℔ gold 12c; over 250 ℔s 12½c, gold
Armitage's Mouse Hole.....gold 11c
Wilkinson's.....₱ ℔ gold 11½c
Eagle Anvils, ₱ ℔ 11c currency.....dis 15&10 %

Apple Parers.
Domestic.....
Turn Table.....
Lightning.....
Hudson's.....
Reading.....
Union.....
Skeleton Paring, Coring and Slicing.....
Bay State, Paring, Coring and Slicing.....$15 00 dis 5 %
Climax Slicer.....9 00 dis 5 %
Bay State Peach Parer.....$11 00 @ 11 50
Lightning " " .....11 00 @ 11 50
Peach Stoner and Halver.....7 00

Augers and Bits.
Snell Mfg. Co.....dis 15 @ 20 %
Russell Jennings.....dis 10 %
Douglass Mfg. Co., Extra.....
" " No. 1.....
" " Hollow Augers.....dis 20 %
Cushman's Expanding Hollow Augers.....dis 30&10 %
Ives' Augers and Bits.....dis 30&10 %
" Gouge Lip Augers and Bits.....dis 30&10 %
" Hollow Augers.....dis 30&10 %
" Expansive Hollow Augers.....dis 30&10 %
" Expansive Bits.....dis 20&10 %
Andrews' Bits.....dis 25 %
Cark's Expansive Bits.....dis 15 %
Cook's Patent Augers.....dis 50 %
" " Bits.....dis 40&10 %
Shepardson's Double Cut Bits.....dis 20 %
Griswold's Patent.....dis 20 %
Cast Steel Cut Augers.....dis 30&10 %
" Auger Bits.....dis 30&10 %
Gimlet Bits.....dis 10&10 %
Long Augers.....new list dis 30 %
Bonney's Patent Hollow.....$48 per doz—dis 25 %
Stearns' " .....$48 per doz—dis 25 %
Morse's Bit Stock Drills.....dis 20 %
Nobles Mfg. Co. C. S. Cut Augers.....dis 30&10 %
Watrous Snap Augers.....dis 15 %
Vaughan's Post Hole—
6 in. $23 60; 9 in. $25 per doz.....dis 20 %

Axes.
Brook's.....per doz $12 00 @ 14 00 net
Hood's.....per doz $12 50 @ 14 00
Hunt's.....₱ doz $14 00 @ 19 00 dis 5&5&5 % cash
Collins'.....₱ doz 11 00 @ 15 50 net @ dis 5 %
Hurd's.....₱ doz 12 50 @ 13 50
Schweitzer Mfg. Co.'s.....₱ doz 13 00 @ 15 00
Simmons'.....₱ doz 12 50 @ 14 00
Morris'.....₱ doz 12 50 @ 13 50
Red Jacket.....₱ doz 12 00 @ 12 50
Mann's.....₱ doz 12 50 @ 13 00
Double Bitted.....₱ doz 21 50 @ 22 00
Lowell Tool Co., "Peerless".....₱ doz 13 00 @ 14 50
Underhill's.....₱ doz 12 00 @ 13 00
" Crown.....₱ doz 12 50 @ 13 50
John Leverett's.....₱ doz 12 50 @ 15 50
Nobles Mfg. Co. S. B.....₱ doz 12 50 @ 13 00
" D. B.....₱ doz 22 00 @ 23 00

Balances.
Chatillon's.....
Frary's.....
Morton's.....
} new list dis 15 %

Bands.
Patent.....new list dis 50&5 %
Iron Rim.....new list dis 25&5 %
Brass (Plated list).....new list dis 50, 10&5 %
Goodale.....new list dis 50&5 %

Belts.
Hand, Light Brass.....dis 66⅔&10 %
Waste Metal.....dis 30&10 %
Bevis.....dis 50 %
Gutta Percha.....dis 15&10 %
Page's.....dis 10&10 %
Taylor's Patent Door.....dis 25 %
Western Gong.....dis 25 %
Brooks's Crank.....revised list dis 50 %
" Pull.....revised list dis 50 %
Hart Mfg. Co., Crank and Pull.....dis 50&10 %
Cow—Common Wrought.....dis 20&10 %
" Western.....new list dis 20&10 %
" Kentucky "Star".....new list dis 20&10 %
" Dodge's Genuine Kentucky.....new list dis 35 %
" Yost's Genuine.....dis 20 %
" Texas.....dis 35 %
Call.....dis 15 %

Bellows.
Blacksmiths'.....dis 20 %
Moulders'.....dis 15 %
Hand Bellows.....dis 10 %

Blind Fasteners.
Van Sand'e.....₱ gross $14 00
Washburn's Patent.....₱ gross 14 00
Merriman's.....

Blind Staples.
Boardman's Patent, ½ in. and larger.....₱ ℔ 37 c
" ⅝ in....." " 42 c

Bolts.
Carriage and Tire, Ætna Nut Co.....dis 60 %
Stove, Ætna Nut Co.....dis 10&5 %
Cast Iron Barrel Shutter, &c.....new list dis 60&10 %
Wrought Iron Barrel.....new list dis 50&10 %
" " Square.....new list dis 50&10 %
Wrought Iron Flush.....dis 15 %
Carriage and Tire, Common.....dis 50&10&5 %
" " " Norway Iron.....dis 50&10 %
Star, Philadelphia.....dis 50 @ 50&10 %
Eagle, Philadelphia.....dis 50 @ 50&10 %
Philadelphia Pattern, R. B. & W.....dis 50&10 %
Tire, Bessemer Steel, Hubbard & Curtiss.....dis 50 %
Carriage and Tire, R. B. & W.....old list dis 30&5 %
Plow, R. B. & W.....dis 30 %
Stove, R. B. & W.....dis 10 %
" Shelton Co. Shaved Heads.....dis 15 %
Union Nut Co., old list.....dis 30&2½&5 %
" " Stove.....dis 15 %
Machine.....dis 40 @ 45 %

Horse Nails—In cases of 100 lbs.....₱ ℔ 16c

Boring Machines.
Kellogg's.....dis 15 %
Snell Mfg. Co., Rice's Patent.....dis 15 %
" " Regular.....dis 15 %
Douglas Mfg. Co.....dis 20 %
Mortising Machines each.....$18 00

Bow Pins.—Union Nut Co., new list.....dis 50&10 %

Braces.
Hillreth's Patent.....dis 40, 10&5 %
Barger's Patent.....dis 40&5 %
Q. S. Backus.....dis 4.&10 %
Wilson Mfg. Co.....new list dis 10 %
Spofford's Patent.....dis 40&5 %
Noble's Patent.....dis 40&5 %
Bartholomew's American Ball.....dis 10&10 %
" Patent Grip.....dis 40 %
Ives' Novelty.....dis 40&5 %

Bull Rings.—Union Nut Co., new list.....dis 50&10 %

Bung Hole Borers.
Common and Ring.....dis 25 %
Enterprise Mfg. Co.....dis 20 %
Ives' Tap Borers.....dis 25 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co.....dis 20&10 %
Bradley's.....dis 2½ %
Beatty's.....new list dis 10 %

2	3	4	5	6	7	8	9
$19 00	$21 50	$24 00	$27 00	$30 00	$33 50	$36 50	$40 00

Hart Mfg. Co.....dis 45&10 %

0	1	2	3	4
$25 25	$29 75	$30 25	$38 75	$43 55	$48 50	$54 00

Butts.
Wrought Brass.....new list dis 30 %
Cast Fast Joint, Narrow.....dis 50&5 %
" " " Broad.....dis 50&5 %
Cast Loose Joint.....dis 60&5 %
" " Mayer.....dis 50&5 %
" " Parliament.....dis 50&5 %
Drilled Wire Jointed—
Narrow.....dis 50&10 %
Broad.....dis 50 %
Loose Joint.....dis 60 %
Mayer's.....dis 50 %
Parliament.....dis 50 %
Loose Pin.....dis 5 %
Wrought Fast Joint, Narrow.....dis 30 %
Wrought Broad.....dis 35 %
" Loose Joint.....dis 35 %
Wrought Table and Back Flaps.....dis 3 %
Palmer Blind Butts.....dis 30&10 %
Nicholson Blind Butts.....dis 40&10 %
Parker's Blind Butts.....dis 55&10 %
Hunter's Blind Butts.....dis 30&10 %
A. S. Parker's.....dis 40&10 %
Clark's Surface Blind Hinges, Nos. 1, 3 and 5.....dis 55&10 %
" " " No. 20.....dis 55&10 %
" Mortise " No. 2, 4, 4½, 6, 8, 10.....dis 35 %
Seymour's.....dis 55&10 %
Shepard's.....dis 55&10 %
Garretson's.....No. 1, dis 5&10 %; Nos. 2 and 7 dis 55&10 %
The American Spiral Spring Butt Co.....dis 20 %
Standard.....dis 55&10 %

Caps—Percussion, per 1000.
J. D.....31c
Lily's E. B.....1-4s, 58c.; 1-10s, 65c., gold
" Double Waterproof, 1-4s, $1 45; 1-10s, $1 52½c., gold
" Colt's.....1-10s 70c., gold

Carpet Sweepers.
Union.....each $2 75 net
Welcome.....each 2 75 net

Cartridges.
Metallic.....dis 50 @ 50&10 %

Cards.—Horse and Curry.....dis 25&10 %
Cotton.....new list dis 10&10 %
Wool.....new list dis 10&10 %

Carpet Stretchers.
P. S. & W.....per doz $2 03; dis 33⅓ %

Cattle Leaders—Union Nut Co., new list.....dis 50&20 %

Chain

English Coil.....net gold						
₱ ℔	.13	9¾	℔	8½	8¼	8c
	3-16	¼	5-16	⅜	7-16	½

Trace, 6½-10-2.....by the cask, ₱ pair, gold, 59c
Trace, 7-10-2.....by the cask, ₱ pair, gold, 63c
Galvanized Pump Chain.....₱ ℔ 14c
German Halter Chain.....new list, Jan. 1, dis 15 %
German Coil.....new list, Jan. 1, dis 15 %
Jack Chain, Iron.....dis 50 %
" Brass.....dis 40 %

Chalk.
White.....₱ gross, 50c
Red.....₱ gross, 75c
Blue.....₱ gross, 90c
Crayons.....₱ gross, 14c

Cherry Stoners.
Family.....₱ doz $4 50

Chisels.
Socket Firmers.....dis 60&10 %
Socket Framing.....dis 60&10 %
Socket Corner.....dis 60&10 %
Tanged Firmers.....dis 40 to 40&10 %
Butcher's.....$5 50 to £ gold—new list
Newbould's.....$5 50 to £ gold
Spear & Jackson's.....$5 50 to £ gold—new list

Clamps.
Judd's.....dis 45&10 %
Lambert's.....dis 20 %
Providence Tool Co.....dis 10 %

Clips, Axle.
Norway or Best.....dis 30 %
Superior.....dis 50 %
"Star," Superior Philadelphia.....dis 45&5 %

Coal Shovels.
Iron Handled.....₱ doz, $ 85 @ 1 25
Wooden Handled.....₱ doz, 1 00 @ 2 00

Coal Hods.—Smith, Burns & Co.....dis 15 @ 25 %

	14	15	16	17	18	inch.
Japanned	$6 00	6 35	6 75	7 50	8 00	per doz.
Galvanized	9 50	10 00	10 75	11 50	12 50	"

Morning Glory Funnel Hods—

	No. 15	16	17	
Japanned	$9 00	10 50	12 00	per doz
Galvanized	13 00	14 50	16 00	"

Cockeyes......dis 30 %

Cocks.
Brass Racking.....dis 25 %
Lock and Globe.....dis 25 %

Coffee Mills.
Board and Box.....dis 15 %
Increase Wilson's.....new list dis 15 %
Selsor's Pat.....$9 50, $10 50—dis 25 %
French Steel.....dis 15 %
The Swift.....dis 25 %
" American".....dis 20 %
Enterprise Mfg. Co.....dis 20 %
Diamond, per doz $4 00.....dis 10 %

Compasses and Dividers.
Bemis'.....dis 35 %
Cook's.....dis 15 %
Excelsior.....dis 30 %
Peck Stow & Wilcox.....dis 25 %

Coopers' Tools.
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 20 @ 25 %
Swan & Brombacher.....dis 15 @ 20 %

Corkscrews......dis 25 %

Corn Knives and Cutters.
Bradley's.....dis 10 %

Croquet.—Phineas Smith.....dis 40&10

Crow Bars.
Cast Steel.....₱ ℔ 11c. net
Iron, steel points.....₱ ℔ 6½c

Crucibles.
Gautier & Co.....₱ No. 5½c

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass.....dis 20 %
Fitch's.....dis 15&10 %
Rubber.....₱ doz, $9 00—dis 15 %
Schweitzer Mfg. Co.....dis 20 %

Curtain Pins.
Silvered Glass.....old list dis 45&10 %

Cutlery.
American Table.....net list
American Pocket.....dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co...dis 20&10 %

Dippers.
Cocoa, Plain.....per doz $3 25, dis 20 %
" Rimmed.....per doz 3 75, dis 20 %

Dog Collars.
Embossed Gilt.....dis 20 %
Leather.....dis 20 %

Door Springs.
Gray's.....$7 50 ₱ doz—dis 50 %
Torrey's Patent.....$7 50 ₱ doz—dis 50 %
Palmer's Japanned No. 6.....₱ doz $5 00
" Copperred " ....." 6 00
" Silvered " ....." 8 00
Challenge.—
Japanned.....₱ doz $4 00 @ 6 00
Bronzed.....₱ doz 5 00 @ 7 00
Nickel Plated.....₱ doz 6 50 @ 9 00
1 Gross lots.....dis 10 %
5 Gross lots.....dis 20 %

Drawing Knives......dis 60 @ 60&10 %
Bradley's.....dis 25 %
Adjustable Handled.....dis 10 %

Drills.
Ingersoll's Ratchet.....dis 25 %
Moore's Triple Acting Ratchet.....dis 20 %
Whitney's Ratchet.....dis 20 %
Blacksmiths'.....each $3 25 dis 10 %

Drill Chucks.
The Danbary.....each 10 00—dis 25 @ 30 %

Drug Mills.
American Drug Mills.....dis 20 %

Egg Beaters.
Monroe's.....₱ doz net $8 25 @ 8 50
Dover.....₱ doz net $6 00
National.....₱ doz $4 00—dis 20 %
Peerless.....₱ doz $4 00—dis 10 %

Emery.
Genuine Chester—Regular Nos.....₱ ℔ 7c } dis 5 @ 10 %
" Flour and FF.....₱ ℔ 4c }
Washington Mills—Regular Nos.....₱ ℔ 8c
" " Flour.....₱ ℔ 5c

Enameled and Tinned Ware.
Kettles.....dis 35 %
Sauce Pans.....dis 25 %
Glue Kettles.....dis 20 %
Tinned Saucepans.....dis 25 %

Escutcheons.
Brass Tinned.....dis 60&10 %
Wood.....dis 25 %

Faucets.
Cork Lined, Wood.....dis 60 %
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 10&10 %
Taylor's Pattern " .....dis 20&10 %
Wood and Metallic.....dis 40 %

Felloe Plates......₱ ℔ 14c; dis 10 %

Files.
American File Co.....$5 00 to £ currency—dis 10 %
Nicholson.....$5 00 to £ currency—dis 10 %
Newbould's.....5 25 to £ gold
J. & Riley Carr's Files and Rasps.....5 50 to £ gold
Stubs'.....8 50 @ 9 00 to £ gold
Butcher's.....5 50 to £ gold
Walter Spencer & Co.'s "Diamond".....5 25 to £ gold
Spear & Jackson's.....5 00 to £ gold
Hargreaves, Smith & Co.'s.....5 00 to £ gold
Jowitt's.....5 25 to £ gold
" Western".....5 00 to £ net
W. K. & C. Peace's "Imperial".....5 25 to £ gold
R. Ibbotson.....5 00 to £ gold
Beam & Murray, "Cyclops".....4 85 to £ gold
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.).....5 00 to £ gold
" Horse Rasps.....5 50 to £ gold
"Philo Sheffield," P. T. Co.....5 00 to £ gold

Floral Tools......dis 25 %

Fluting Machines.
Mrs. Coles, 7 inch rolls.....6 50
" " 5 " 5 50
Knox, with 4-inch Rolls.....5 00 each dis 10 %
" " 6 " .....6 00 each dis 10 %
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " .....5 00 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
Diamond.....7 50 each net
Climax 7-inch Rolls.....8 00 each net
" 4½ " .....6 50 each net
Empire.....4 00 each net
Eureka, No. 1, 7-inch Roll.....8 00 each net
" No. 2, 5-inch Roll.....6 00 each net
K. F. M., 4½-inch Roll.....5 50 each net
" 6-inch Roll.....6 00 each net
Myers' Fashion Fluter, 4½-inch Rolls.....3 00 each net
" Convex Brass Fluter, Sad Iron attachment..$1 75
Domestic Fluter.....$1 75 each net
Fairy, Self-Heater.....8 00 each net
Geneva Hand Fluter.....$15 00 per doz net
Champion, 6 inch rolls.....26 00 each dis 10 %
" 4 inch rolls.....22 00 each dis 10 %

Forges.
Keystone Portable Forge Co.'s.....dis 20 %
"Empire" (W. P. Kellogg & Co.).....dis 20 %

Forks.
Hay, Manure & Spading.....dis 30 %
Plated A 1.....dis 40&5 @ 50&5 %

Freezers.
Champion.....dis 33⅓ %
Torrey's.....dis 50 %

Fry Pans.—P. S. & W.
Tinned.....dis 25 %

₱ doz.	$3 00	3 25	3 62	4 00	4 50	5 00	5 50	6 00	7 50
No.	0	1	2	3	4	5	6	7	8

Smith, Burns & Co., "Excelsior" Polished.....dis 25 %

₱ doz.	$3 70	4 00	4 70	5 30	6 00	7 00	8 00	9 00
No.	1	2	3		5	6	7	8

Gas Stoves.
Tuft & Howard.....dis 20 %

Gauges.
Marking.....dis 45&10 %
Wire.....dis 10 %

Grind Stones.
J. F. Green & Bro.....dis 20 %

Grind Stone Fixtures.....dis 50 %

Hammers.
Emmet Hammer Co.....dis 25 %
Humason & Beckley Mfg. Co.....dis 16⅔&10 %
Maydole's, new list.....dis 5 %
Cheney's.....new list net
Verree's.....dis 5 %
Yerke & Plumb.....new advanced list dis 10 %
Minot & Co.....dis 10 %
Magnetic Tack.....dis 2 &10 %
Warner's.....list net

Handles.
Hammer and Hatchet.....dis 10 %
Quakertown, Axe, Pick and Sledge.....dis 10 %
" Hammer and Hatchet.....net
Greensboro', Axe, Pick, Hammer, &c.....dis 10 %
Woolworth Axe, Pick and Sledge.....dis 10 %

Brad Awl	per gross	$3 50—dis 20&10 %		
Hickory Firmer Chisel, ass'td		5 25—dis 10&10 %		
" " "	large	"	6 25—dis 10&10 %	
Apple " "	ass'td	"	6 00—dis 10&10 %	
" " "	large	"	7 00—dis 10&10 %	
Socket " "	ass'td	"	8 50—dis 10&10 %	
" " Framing	"	"	6 00—dis 10&10 %	
Flie	"	"	3 50—dis 10&10 %	
Auger	"	"	5 50—dis 10&10 %	
"	large	"	6 50—dis 10&10 %	

Hangers.
Barn Door.....revised list dis 60&10 %
"Anti-Friction" (Rider, Wooster & Co.).....dis 20 %
Novelty.....dis 30 %

Harness Snaps.
Henshaw's.....dis 25&10 %
Judd's.....dis 40 %
Fitch's.....dis 30 %
Hotchkiss'.....dis 10 %
Andrews'.....dis 25 %
Sargent's.....new list dis 50&10 %

Hatchets.—Isaiah Blood.....dis 10 %

Shingling, Nos. 1 2 3	₱ doz	$7 50	8 00	8 50	
Claw, " 1 2 3	₱ doz	8 50	9 00	9 50	
Lathing, " 1 2 3	₱ doz	7 50	8 00	8 50	
Hunt's.....dis 10 %					
Shingling, Nos. 1 2 3	₱ doz	$7 25	8 00	8 75	
Claw, " 1 2 3	₱ doz	7 75	8 50	9 25	
Lathing, " 1 2 3	₱ doz	7 50	8 25	9 00	
Hurd's.....dis 30 %					
Shingling, Nos. 1 2 3	₱ doz	$8 00	8 50	9 00	
Claw, " 1 2 3	₱ doz	9 00	9 50	10 00	
Lathing, " 1 2 3	₱ doz	8 00	8 50	9 00	
Newark's Edge Tool Co.'s.....dis 25 %					
Shingling, Nos. 1 2 3	₱ doz	$6 50	7 00	7 50	
Claw, " 1 2 3	₱ doz	7 25	7 75	8 25	
Lathing, " 1 2 3	₱ doz	6 50	7 00	7 50	
Yerks & Plumb.....dis 10 %					
Shingling, Nos. 1 2 3	₱ doz	$7 00	7 50	8 00	
Claw, " 1 2 3	₱ doz	7 50	8 00	8 50	
Lathing, " 1 2 3	₱ doz	7 00	7 50	8 00	
Simmon's.....dis 15 %					
Shingling, Nos. 0 1 2 3	₱ doz	$7 50	8 00	8 50	9 00
Claw, " 1 2 3	₱ doz		9 00	9 50	10 00
Lathing, " 1 2 3	₱ doz		8 00	8 50	9 00
Broad, " 1 2 3	₱ doz		9 00	10 00	12 00
" " 4 5 6	₱ doz		14 00	16 00	18 00
" " 7 8	₱ doz		20 00	22 00	
Elephant.....dis 25 %					
Shingling, Nos. 1 2 3	₱ doz	$8 00	8 50	9 00	
Claw, " 1 2 3	₱ doz	9 00	9 50	10 00	
Lathing, " 1 2 3	₱ doz	8 00	8 50	9 00	
J. P. Verree & Co.....dis 5 %					
Shingling, Nos. 1 2 3	₱ doz	$7 00	7 50	8 00	
Claw, " 1 2 3	₱ doz	7 50	8 00	8 50	
Lathing, " 1 2 3	₱ doz	7 00	7 50	8 00	
Underhill's.....dis 10 %					
Shingling, Nos. 1 2 3	₱ doz	7 25	8 00	8 75	
Claw, " 1 2 3	₱ doz	7 75	8 50	9 25	
Lathing, " 1 2 3	₱ doz	12 00	11 00	13 00	

Hinges.
Wrought Strap and T.....dis 20&10 %
Providence Plate. { 6 and 8 in. list 11c. / over 8 in. list 9½c. }.....dis 20&5 %
Screw Hook and Strap. { 8, 10, 12 in. 7½c / 14 to 36 in. 5½c }.....net
Heavy Welded Hook. { 8 to 12 in. 9c / 14 in & up, 8½c }.....dis 10 %
Screw Hook and Eye. { ⅜ to 1 in. 9½c / ⅝ in. 10½c / ½ in. 12½c }.....net

Hoes.
Solid Shank, C. S.....₱ doz $8 00—dis 30 %
Socket.....₱ doz 9 00—dis 30 %
Riveted Eye.....₱ doz 5 00—dis 30 %
Grub.....dis 20 %
Planters'—Winsted.....add 10 %
Scovill.....add 33⅓ %
Scovill Pattern (Winsted).....add 20 %

Hooks.
Belt.....dis 50&10 %
Clothes Line.....dis 60&10 %
Bench—Skinner's.....per doz $8 00, dis 30 %
Bench—Hotchkiss' $5 00 ₱ doz.....dis 10 %
Bench—Weston's No. 1, $8 00; No. 2, $7 00 per doz net
" —McGill's.....$8 00 per doz, dis 10 %
Wardrobe, Japanned.....new list dis 60&10 %
Hat and Coat " .....new list dis 60&10 %
Wrought Staples and Hooks and Staples.....dis 60, 10&10 %
Screw Hooks and Eyes, revised list.....dis 20&5 %
Grass.....dis 2 %
Whiffletree—Patent.....dis 30 %
Hooks and Eyes—Malleable Iron.....dis 55 %
" " Brass.....dis 55 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 2000 lbs. dis. 5 %.
Ausable Horse Nail Co.

No.	5	6	7	8	9	10
Ausable	30c	27c	25c	24c	23c	22c
Polished and Polished Blued	31c	29c	26c	25c	24c	23c
Pointed and Blued	32c	29c	27c	26c	25c	24c

In lots of 1000 lbs., 5% discount.
Brundage.

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22c	21c

In lots of 500 lbs., dis. 5 %.
American Pressed.

No.	5	6	7	8	9	10
	22c	20c	20c	20c	20c	20c

In lots of 1000 lbs. dis 5 %.
Perkins Finished (ready to drive).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs. dis 5 %.
Buffalo Forged.

No.	6	7	8	9	10
	28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished).

No.	5	6	7	8	9	10
	23	25	23	22	21	20
Extra	30	27	25	24	23	22

In lots of 1000 lbs., dis 5 %.
Vulcan (Blued, pointed, ready to drive).

No.	5	6	7	8	9	10
	33c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs 7½ % discount.
New London Horse Nails.

No.	6	7	8	9	10
Great Western	27c	25c	24c	23c	22c
U B	29c	27c	26c	25c	24c

In lots of 1000 lbs., dis 5 %.
Star Brand.....₱ ℔ 16c
Morgan.....14c

Horse Shoes.
Burden.....₱ keg, $5 85
R. I. Horse Shoe Co., Perkins Pattern.....₱ keg, 5 85
" " R. I. Pattern.....₱ keg, 6 35
Mule Shoes.....₱ keg, 6 85

Ice Picks.
Iron.....₱ gross $12 00 @ $16 00 net
Whiting's.....per doz $2 50 dis 1 %
W. H.....per doz 1 00 dis 10 %
Dunlap's.....per doz 3 00 net

Kettles.
Brass.....₱ ℔ 55c net
In lots of 500 lbs.....₱ ℔ 50c net

Knives.
Ames' Butcher Knives.....dis 20 %
" Shoe.....dis 15 %
Hay and Straw, "Wadsworth's".....dis 30 %

Knobs.
Base—Common.....net
" Plush Tip.....dis 10 %
" Elastic End.....reduced list dis 10&10 %

Ladles.
Melting.....dis 20 %

Lanterns.
Brady's Patent.....dis 10 %
Etna.....dis 10 %
Yankee.....dis 10 %
De Beque.....dis 10 %

Lemon Squeezers.
Porcelain Lined.....per doz $7 00, dis 10 %

Lines.
Linen Fish.....dis 10&10 %
Chalk.....dis 40 %
Galvanized Wire Clothes.....per doz 9 00 net

Locks and Latches.
Cabinet—Eagle.....dis 25 %
Cabinet—Gaylord.....dis 25 %
Trunk.....dis 10 %
Continental.....dis 15 %
Shepardson's.....dis 20 %
Scandinavian Jail.....dis 10 %
American Lock Co.....dis 33⅓ %
Plate.....dis 25 %
Pad.....new list dis 50, and 2 % for cash
Barnes & Deitz.....dis 25 %
Yale Lock Co.....dis 40 %
Sargent & Greenleaf.....dis 20 %
Trenton Lock Co.....
Branford.....
Norwich.....
Russell & Erwin.....
Norwalk.....
Nashua.....
Mallory, Wheeler & Co.....
P. & F. Corbin.....
Parker & Whipple.....
Jacobus & Nimick Mfg. Co.....
} New list dis 45 %, 2 % extra for cash.

Mallets.
Hickory and Lignumvitæ.....dis 10&10 %

Meat Cutters.
Dixon's (P. S. & W.).....dis 10 %

No.	1	2	3	4
₱ doz.	$14 00	$17 00	$19 00	$30 00

Hales'.....dis 25 %

No.	11	12	13
₱ doz.	$27 00	$33 00	$42 00

Miles Challenge.....dis 20 %

No.	1	2	3
₱ doz.	$22 00	$30 00	$40 00

Perry's Champion (P. S. & W.).....dis 10 %

No.	200	300	400
₱ doz.	$22 00	$27 00	$40 00

Woodruff's (P. S. & W.).....dis 10 %

No.	100	150
₱ doz.	$15 00	$18 00

American.....dis 25@25&5 %

No.	1	2	2½	3	4	B	5
Each	$6 00	$9 00	$12 00	$15 00	$30 00	$40 00	$75 00

Molasses Gates.
Stebbins' Pattern.....dis 60&10 %
Tinned ends.....dis 40&10 %
Patent Self-Measuring.....per doz $47 00—dis 20 %
Bush's.....dis 20 %
Lincoln's.....dis 50&10 %

Mortars and Pestles.
Iron.....net

Mouse Traps.
Wood Choker.....₱ doz holes, 16 @ 18c
Round, Wire.....₱ doz $1 40 to 2 00 net
Square, " .....₱ doz 2 00 to 2 50 net
Cage, " .....₱ doz 3 50, dis 10 %

Mowers, Lawn.
Excelsior.....dis 25 %

Nails......10d $3 75 @ 3 90

Nail Pullers.
Capewell's Giant.....per doz $30 00 net

Nuts and Washers.
Nuts.....large, 6c; small, 8c off list.
Washers.....large, 8c; small, 10c off list.

Oil Stones.
Washita No. 1.....₱ ℔ 22c
Washita Slips.....₱ ℔ 45c
Washita No. 2.....₱ ℔ 17c
Arkansas.....₱ ℔ 1 25
Hindostan.....₱ ℔ 6c dis 10&10 %
" Slips.....₱ ℔ 10c dis 10&10 %

Oilers.
Olmsted's.....new list dis 25&10 %
Broughton's.....dis 25&5 %
Malleable.....per doz $5 00 dis 10 %
Common Tin.....dis 30 %
" Zinc.....dis 30 %
" Brass and Copper.....dis 30 %
Prior's.....dis 30&10 %

Ox Shoes.
Concave.....₱ ℔ 13c net

Picture Nails and Knobs.
Richards' Patent.....dis 40 @ 40&10 %
Judd's.....dis 60&10 %

Pinking Irons......per doz $3 00—dis 60&10 %

Planes.
Auburn Tool Co.'s.....dis 30&10 %
Ensenore, Bench.....dis 50 %
Chapin's, 1st quality.....dis 25&10 %
Chapin's 2d quality.....dis 33⅓&10 %
Greenfield Tool Co.....dis 25&10 %
" New York".....dis 40 %
Sandusky Tool Co., 1st quality.....dis 33 %
" " 2d " (Ogouta).....dis 50 %
Ohio Tool Co., 1st quality.....dis 35 %
" " 2d quality (Sciota).....dis 50 %
Owasco Tool Co., 1st quality.....dis 33&10 %
" " 2d quality.....dis 50 %
Howland's, 1st quality.....dis
Bailey's Patent Adjustable.....dis 20&10 %
Plane Irons, Butcher's.....$5 50 to £ gold—new list
" Auburn Tool Co.'s.....dis 25 %
" Chapin's.....dis 10&10 %
" Greenfield Tool Co.....net list
" Ohio Tool Co.....dis 10 %
" Spear & Jackson's.....5 50 to £ gold—new list
" Sandusky Tool Co.....dis 10 %
Plow Bits, Greenfield Tool Co.....dis 10 %

Pliers.
Button's Patent.....dis 33⅓ %

Plumbs and Levels.
Chapin's.....dis 66⅔&10 %
Standard Rule Co.'s New Adjustable.....dis 60&10 %
Standard Rule Co.'s Non-Adjustable.....dis 60&10&10 %
Stanley Rule and Level Co.....dis 60&10&10 %

Pulleys.
Jap'd Screw.....dis 55&10 %
Brass Screw.....dis 55&10 %
Jap'd Side.....dis 55&10 %
" Clothes Line.....dis 55&10 %
Hay Fork.....per doz $4 50 @ 5 00, dis 10 %

Pumps.
Douglas Cistern, etc.....new list dis 25 %
" S. & F.....new list dis 20 %
Union Mfg. Co's. Cistern and Pitcher.....dis 33⅓ %
" " " Rams.....dis 20 %
" " " Garden Engines.....dis 10 %
Cucumber (Burlingham & Purdy)—
" Mill.....dis 25 %
" Cross Cut.....dis 15 %
" other kinds.....dis 12½ %
Livingston's Framed Wood.....dis 10 %
Livingston's Butcher and Kitchen.....dis 10 %
H. W. Peace's Circulars.....dis 10 %
" Other kinds.....dis 10 %
Wm. McNeice's hand, Cross Cut and Circular.....new list dis 15 %
Wm. McNeice's Patent Pole Pruning Saw.....dis 10 %
" " " Compass Saw.....net.
E. M. Boynton's Lightning, dis 30&5 % for immediate cash
" " Others.....dis 15 %
Wheeler & Clemson Mfg. Co.'s Hand.....dis 15 %
" " " Cross-Cut.....dis 30 %

Saw Sets.
Hart's Patent.....dis 15 %
Nash's.....dis 20&10 %
Bemis'.....dis 10 %
Aiken's Genuine.....dis 25 %
Hotchkiss'.....dis 10 %
Common Lever.....per doz $1 80 net
Leach's.....dis 15 %

Scales.
Hatch.....dis 25 %
Tea.....dis

Coffee Boiler Lips.

	Small.	Large.
To Rivet, per gross,	$0·80	1·10
To Solder, "	1·25	

Plain Stamped Water Dippers.

	½ pint.	Pint.	Quart.	2 quarts.	2½ quarts.
Per doz	·90	1·15	1·50	1·85	2·50

RETINNNED WARE, dis 20 @ 25 %.

Retinned Milk Pans.

Qts...	½	1	1½	2	3	3½	4	5	6	8	10	12
₱ doz.	1·20	1·50	1·75	2·00	2·25	2·75	3·15	3·50	3·85	4·75	5·25	5·75

Dipper Bowls, Plain Stamped, dis 20 @ 25 %

Pints...	½	1	Quarts....	1	2	3½
Per doz.	·60	·75	Per doz...	1·00	1·25	1·75

Dipper Bowls, Retinned, dis 20 @ 25 %

Pints....	½	¾	1	Quarts....	1	2	3½
Per doz.	·75	·90	1·05	Per doz ..	1·40	1·75	2·25

Pans.

Dish Pans, Tinned, dis 20 @ 25 %

Quarts	7	8	10	14	17	21	30
Per doz.	8·50	9·50	11·00	13·00	16·00	19·00	30·00

JAPANNED TIN WARE.

Canisters, Common, dis 10 %

Pound	½	1	2	3
Per doz	$1·10	1·60	2·50	3·25

Canisters, Bunged, dis 10 %

Pound	1	2
Per doz	$1·75	2·75

Candlesticks, Japanned, dis 10 %

No	1	2
Per gross	$8·00	7·00

Cake Boxes, Round, per nest, $3·25, dis 10 %

" Square, per nest, 4·25, dis 10 %

Chamber Pails, Japanned (Smith, Burns & Co.), dis 10 %

Nos	2	3	4	5
Greed. per doz	$8·00	9·00	10·50	12·50
Oak " "	$9·50	10·50	12·00	13·50

Dust Pans, Corrugated, per gross, $22·00, dis 10 %

Box Graters, per gross, $4·00, dis 10 %

Molasses Cups, dis 10 %

Pint	½	1	2
Per doz	$1·25	·90	1·77

Lunch Boxes, per doz. 7 in $2·00; 8 in. $2 50; dis 10 %

Pepper Boxes Japanned, dis 10 %

Per gross, Small, $3·00; Large, $4·00

Toy Banks, House, dis 0 %

Tea Trays, American Tea Tray Co., dis 15 %

No	1	2
Per gross	$7·00	5·50

Toy Banks Gothic, dis 10 %

No	1	
Per gross	$5·50	

Toy Cups, Straight, dis 10 %

No	1	2	3
Per gross	$4·00	3·50	3·50

Toy Cups, Flaring...No. 1, $4·25; 2, $3·70 ₱ gross, dis 10 %

Toy Pails, Covered, dis 10 %

No	1
Per gross	$4·50

Toy Rattles, per gross, $2·25, dis 10 %

Trunks, Wire Handled, per nest (5) $1·50, dis 10 %

Spittoons, Tin....per gross, No. 2, $30, No. 3, $27, dis 10 %

PLANISHED TIN WARE.

Planished Coffee Pots, Round, dis 25 @ 30 %

Each	·60	·75	·85	·95	1·15	1·25	1·30	1·40
Pints	1	2	3	4	5	6	7	8

Planished Tea Pots, Round, dis 25 @ 30 %

Each	·70	·80	·90	1·05	1·15	1·40	1·75
Pints	2	3	4	5	6		

Planished Tea Pots, Oval, dis 25 @ 30 %

Each	·70	·80	·90	1·05	1·15	1·40	1·75
Pints	1	2	3	4	5	6	8

Planished Pepper Boxes, No. 1, per doz., $1·52

Planished Flour Dredges, No. 3, $2·10; 4, 2·45 ₱ dozen.

Planished Round Coffee Biggins, dis 25 %

Pints	3	3	4	5	6	8
Each	$1·00	1·10	1·20	1·40	1·60	2·00

Planished Oval Coffee Biggins, dis 25 %

Pints	2	3	4	5	6	8
Each	$1·15	1·25	1·40	1·60	1·80	2·25

Planished Oval Chafing Dishes, Imperial Covers, dis 25 %

Inch	10	12	14	16	18	20	22	24
Each	$3·95	5·00	6·25	7·60	9·00	11·50	15·00	16·50

Planished Oval Chafing Dishes, Low Covers, dis 25 %

Inch	10	12	14	16	18	20
Each	$3·25	4·25	5·20	6·20	7·80	9·25

Planished Low Dish Covers, dis 25 %

Inch	10	11	12	14	16	18	20
Each	$ ·70	·80	1·00	1·25	1·80	2·00	2·75

Planished Imperial Dish Covers, dis 25 %

Inch	10	11	12	14	16	18	20	22	24
Each	$1·55	1·70	2·00	2·60	3·15	3·45	4·00	5·45	6·30

Planished Etnas, on Stands, dis 25 %

Pints	1½	2	3	4	5
Each	$0·90	1·00	1·20	1·50	1·75

Planished Liquor Mixers, dis 25 %

Nos	0	1	2
Per doz	$2·00	2·10	2·45

Planished Oval Melon Molds, dis 25 %

Nos	2	3	4	5	6	7	8	9
Each	$·60	·65	·70	·80	·90	1·00	1·15	1·35

Planished Oval Tumbler Warmers, dis 25 %

To fit 1, 2, 3, and 4 O. G. Urns, each, $2·50

Planished Oval O. G. Urns, dis 25

Nos	0	1	2	3	4	5	6	7	8
Each	$4·90	5·45	6·30	7·00	7·75	9·25	11·25	12·50	15·50

Planished Round Urns, dis 25 %

Nos	0	1	2	3	4	5	6	7
Each	$4·20	4·85	5·45	6·30	7·75	9·00	11·00	14·25

Planished Round Oyster Dishes, (Complete), dis 25 %

Nos	2
Each	$2·10

Planished Oyster Dish Plates, dis 25 %

Nos	1	2
Each	$0·25	0·30

Oyster Dish Covers, dis 25 %

Nos	1	2
Each	$0·30	0·35

Tea Pot Handles—P. S. & W., dis 20 %

Stow's Patent Hollow Tea Pot Handles.

No. 1, Small 4½ inches, per gross, $11·50
No. 2, Medium, 5¾ " " 12·50
No. 3, Large, 6¾ " " 13·50
No. 4, Ex. Large, 7¼ in., for Wash Pitchers, &c., " 18·00

Stow's Patent. New Pattern.

No. 25, Small, 4½ inches, per gross, $11·50
No. 35, Medium, 5¾ " " 12·00
No. 42, Large, 6¾ " " 13·00

Solid Iron, Tin Tipped.

No. 10, Small, 4¾ inches, per gross, $9·00
No. 15, Medium, 5¾ " " 9·50
No. 20, Large, 6¾ " " 10·75

Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.

No. 12, Bronzed and Tin-Tipped, per gross, $13·50

Saucepan Handles, Or Best Malleable Iron.

P. S. & W., dis 20 %

Japanned.

No. 1, 5½ inches long, per gross,	$3·50
No. 2, 6 " "	3·75
No. 3, 6½ " "	4·00
No. 4, 7¾ " "	4·25
No. 5, 8 " "	4·50
No. 6, 9 " "	4·75

Tinned.

No. 1, 5½ inches long, per gross,	$4·25
No. 2, 6 " "	4·50
No. 3, 6½ " "	4·75
No. 4, 7¾ " "	5·25
No. 5, 8 " "	5·50
No. 6, 9 " "	5·75
Japanned, per lb.,	16
Tinned, "	20

Iron Kettle Ears (P., S. & W.), dis 45 %

Half gross pairs in a package.

Tinned.

Nos	1	2	3	4	5	6	7	8
Per gross pairs	.85c	$1·00	1·50	1·75	2·10	2·75	3·75	4·50

Black.

Nos	1	2	3	4	5	6	7	8
Per gross pairs	.75c	.85c	$1·25	1·50	1·75	2·25	2·75	4·00

Tinned Tea Kettle.

Nos	4	5	6
Per gross pairs	$1·75	2·10	2·75

Extra Heavy Tinned Kettle Ears—French Pattern.

Nos	1	2	3	4	5	6	7
Per gross pairs	$1·00	1·25	1·50	1·75	2·25	2·75	3·50

Malleable Iron Kettle Ears for Coal Hods, &c.

P., S. & W., dis 20 %

No. 10 Small, ₱ lb, Tinned, 30c; Black, 16c
No. 20 Medium, ₱ lb, " 30c; " 16c
No. 30 Large, ₱ lb, " 30c; " 16c
No. 40 Extra Large, ₱ lb, " 30c; " 16c

In cases of 100 lbs. each.

Milk Can or Boiler Handles—(P. S. & W.) 4½ in., dis 25 %

Plain, 8c.; Japn'd, 9c.; Tinned, 16c. per lb.; Malleable Clips or Ears to match, Tinned, 20c per lb.

Toilet Ware Handles—4½ inches (P. S. & W.), dis 35 %

Plain with drilled holes, per lb., 9c
Plain with Cast " " 8c

Plasterers' Scrapers—(P. S. & W.), dis 25 %

Extra quality, length 6 in., per doz., $4·00

METALS.

IRON.—DUTY: Bars, 1 to 1¼ cents per lb., Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 2 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 79 cents per 100 lbs. Boiler and Plate, 1¼ cents per lb

Pig Iron—AMERICAN.

Foundry No. 1	₱ ton,	$30 00 @ 32 00
Foundry No. 2	"	28 00 @ 30 00
Gray Forge	"	25 00 @ 28 00
White and Mottled	"	

SCOTCH.

Coltness	"	
Glengarnock	"	34 00 @ 35 00
Eglinton	"	34 50 @ 34 00
Shotmerlee	"	

Bar Iron.

Am. Refined, at mill, ₱ lb 3c

Rails.

Welsh, gold	₱ ton,	48 00 @ 50 00
American, at works, currency	"	36 00 @ 38 00
Old Rails, currency	"	34 00 @ 35 00

Scrap.

Wrought Scrap, from yard, " 35 00 @ 37 00

Bar Iron from Store.

Common Iron.

¼ to 2 in. round and square,	₱ ton,	$ 65 00
⅜@16 in	"	70 00
⅛ in. " "	"	72 50
2½ to 3 in. " "	"	70 00
1 to 6 in. wide x ⅜ and 1 in thick	"	65 00
1¼ to 6 in wide x ½ & 5-16 in. thick	"	77 00
⅞ and 1⅛ in. x ¼ and 5-16	"	72 50
Swedish Iron		
1¼x⅝ and ½	"	155 00
1¼x⅜ to ⅝, and ⅝ square	"	150 00
1¼ to 5x⅛ to ⅝ and ⅜ to 2-in. square	"	145 00
5 to 5x⅝ and ½	"	140 00

Refined Iron.

¼ to 2 in. round and square	"	67 50
1 to 6 in. wide x ⅛ to 1 thick	"	67 50
1¼ to 6 in. wide x ¼ and 5-16 thick	"	72 50
1 and 1¼ x ¼ and 5-16	"	72 50

Large Rounds.

2⅝ to 2¾, round and square	"	77 50
3, 3¼ and 3½ in	"	82 50
3⅝ and 4 in	"	90 00
Rods—⅝ and 11-16, round and square	"	70 00
⅝ and 9-16, " "	"	72 50
⅞-16, " "	"	80 00
⅝, " "	"	85 00
5-16, " "	"	90 00
¼, " "	"	95 00
3-16, " "	"	127 50

Band Iron.

1 to 6 in. x 3-16 to No. 12	"	85 00

Horse Shoe Iron.

⅜ and ½ x ⅜, to ½	"	97 50 @ 105 00
1 x ⅜, to ½	"	

Ova s, Half Ovals and Half Rounds.

⅜ to 1¼	₱ ton,	$ 90 00 @ 92 50
⅝ and 11-16	"	95 00 @ 97 50
⅔ and 9-16	"	100 00 @ 102 50
7-16	"	
⅝	"	

Nail Rods

Best Norway	₱ lb	7¼ @ 8¼c

Norway Shapes

⅛ to 2 in. x ⅛ to ⅜	₱ lb	7¼c
⅛ to ⅜ square	"	

Norway Bar

⅜ to 2 in. square	"	7¼c

Spring Steel

1 to 6 in. wide	"	8c

Tire Steel

⅝ to 1¼ x ¼ and 5-16	₱ lb	7¼ @ 7½c
⅝ & 1 x 3-16	"	7¾c
⅝ & 1 x ⅛	"	8⅛c

Toe Calk Steel

⅛ to ¼ x ⅝ to ½	"	7¼c

Plow Steel

6 to 16 wide	"	8½c

Sleigh Shoe Steel

⅜ to 1½ x ⅜ to ⅝		6¾c
Hoops, ⅝ x No. 22	₱ ton	$152 50
" ⅝ x No. 20	"	127 50
" ⅝ x No. 19	"	122 50
" 1 and 1¼ x No. 18	"	107 50
" 1¼ to 2 and 1x1¼ x No. 13 and 14	"	100 00

Scroll Iron—⅝ x 12, " 130 00

"	⅝ x 10	"	125 00
"	⅝ x 3-16	"	120 00
"	⅝ x ¼	"	115 00
"	⅝ x 14	"	120 00
"	⅝ x 12	"	115 00
"	⅝ x 10	"	110 00
"	⅝ x 3-16	"	105 00
"	⅝ x ¼	"	100 00
"	⅝ x 14	"	97 50
"	⅝ x 12	"	110 00
"	⅝ x 10	"	100 00
"	⅝ x 3-16	"	95 00
"	⅝ x ¼	"	92 50
"	⅝ x 14	"	90 00
"	⅝ x 12	"	115 00

Sheet Iron.

Nos.	American and English.	Common R. G. American.	R. G. English.
10 to 20	₱ lb 4½ @ 4¾c	5½c	6c
21 to 24	" 4¾ @ 5c	6c	6c
25 to 26	" 5 @ 5¼c	6c	6c
27	" 5¼ @ 5½c	6½c	6¼c
28	" 5½c	6¾c	6½c

Galvanized, 1. to 40, prime, ₱ lb 10; 2d quality, ₱ lb 9c

"	21 to 24	"	"	11	"	10c
"	25 to 26	"	"	12	"	11c
"	27	"	"	13	"	12c
"	28	"	"	14	"	13c

Patent Polished, " 15 @ 16c

Russia, Nos. 8 to 26, ₱ lb 18c

" Stained, No. 1, " 17c

Belgian, " 12c

One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON

⅞	5	5½	6	7	inch.
$2·50	3·50	4·50	5·25	6·50	per doz.

RUSSIA IRON.

5	5½	6	7	inch.
7·00	9·50	12·00	14·00	per doz.

BABBITT METAL.

Excelsior	cash, dis 10 %			
No.	1	2	3	Extra.
	10c	12c	15c	20c @ 25c

COPPER—DUTY: Pig, Bar and Ingot, 5c.; old copper 4 cents ₱ lb; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem. All subject to a reduction of 10 per cent.

American Ingot, ₱ lb 22c

English, "

SHEATHING, BRAZIERS COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot, 35c ₱ lb

Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot, 38c. "

Braziers Copper, 12 oz. per square foot and lighter, 41c. "

Circles less than 24 inch in diameter, 38c ₱ lb

Circles, 8 inch diameter and over, 41c. "

Segment and Pattern Sheets, 38c. "

Locomotive Fire Box Sheets, 35c. "

Sheathing Copper, over 12 oz. per sq. ft., 31c. "

" 12 oz. ₱ sq. ft. and lighter, 41c. "

Bolt Copper, 35c. "

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

TINNING.

14x48, by the case	8c. ₱ sheet
14x48, less than case	10c. "
Boiler Sizes, 7 and 8 inch	12c. "
" 9 inch	15c. "
Other sizes not larger than 30x60	2½c. ₱ sq.
Larger than 30x60	5c. "
Copper Bottoms, 32 @ 33c. ₱ lb	net

O NEILL'S PATENT PLANISHED COPPER.

14x48.

14 and 16 oz. and heavier	38c. By the case, 38c. ₱ lb
12 oz. and lighter	42c. " " 41c. "

Boiler Sizes.

7 in., 14x52.	8 in., 14x56.	9 in., 14x60
14 and 16 oz. and heavier		41c. By the case, 40c. ₱ lb

(And all sizes not over 30 inches wide.)

30x60

14 and 16 oz. and heavier	43c. ₱ lb
12 oz.	46c. "

LEAD—DUTY: Pig, $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2¾ cents per lb. All subject to a reduction of 10 per cent.

Spanish	6½ @ 6¾c gold
German Refined	6½ @ 6¾c gold
English	6¾ @ 7c gold
American	5·75 @ 5·80 gold
Bar	dis 20 % 8½c.
Pipe	dis 20 % 9c.
Tin Lined Pipe	dis 10 % 16½c.
Sheet	dis 10 @ 2½ 9c.
Shot	dis 20 %, Drop, 9c.; Buck. 9½c.
Solder	No. 1, 15 @ 15½c; No. 2, 13½ @ 14c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb.; over 11, 3¾ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool	15 @ 16c
Spring	10c
Homogeneous	12½c
Tire	12½ @ 13½c
Machinery (round and square)	10 @ 11c
File	11c
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
Saw Plate, gang and X cut	13 @ 14c
" circular as to size	18 @ 30c

Chrome Steel.

Tool	₱ lb 20 @ 21c
Tool, extra fine	" 40 @ 75c
Spring	₱ lb 12c and upward
Machinery	₱ lb 14c.
Hammer	" 15c.
Gun or Homogeneous	" 16c

English Steel,—payable in gold, dis 5 % cash.

Best Cast	₱ lb	18c
Extra Cast	"	19c
Round Machinery, Cast	"	11½c
Swaged, Cast	"	18c
Best Double Shear	"	18c
Blister, 1st quality	"	13½c
" 2d quality	"	11½c
" 3d quality	"	10½c
German Steel, Best	"	11½c
do 2d quality	"	10½c
Sheet Cast Steel, 1st quality	"	18c
" 2d quality	"	16c
" 3d quality	"	14c
File Steel, Flat and ½ Round	"	12½c
" Square and Round	"	18c
" Mill	"	13½c
" Taper to 4 inch	"	17c
" Taper 3 and 3½ inch	"	18c

SPELTER—DUTY: in Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.

Silesian, cash	6¾ @ 7c., gold
American "	7¼ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per lb.; Manufactures of, not enumerated, 35 per cent. ad val.—all subject to a reduction of 10 per cent. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.

Banca	₱ lb 26c., gold
Straits	₱ lb 24c. gold
English	₱ lb 21½ @ 23c., gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal	11·25 to 11·50
12x12, "	12·00
14x20, "	12·25
I X 10x14, "	13·75
12x12, "	14·25
14x20, "	14·75
D C 12½x17 "	11·00
D X 12½x17 "	12·25
For each additional X add	2·25

COKE TIN PLATE.

	Best	2d Quality.	Ordinary.
I C 10x14	$10·50 @ 11·00	9·50 @ 10·00	9·00 @ 9·50
I C 12x12	11·00	10·50	
I C 14x20	11·25	10·50	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$10·25 @ 10·50	9·75 @ 10·25	9·00 @ 9·00
I X 14x20	12·75		
I C 20x28	21·00 @ 22·00	20·00 @ 21·00	17·00 @ 19·50
I X 20x28	26·00		
I C 20x200 ft.	23·00		

ZINC.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet 2½c. ₱ lb. All subject to a reduction of 10 per cent.

Sheet, cask	9¼c
" open	9½c

Paper Stock, Old Metals, &c.

(*Dealers' Selling Prices.*)

Canvas linen	6¼ @
" cotton, No. 1	@ 4
" " No. 2	@ 5
White linen rags, No. 1	6¾ @
" " No. 2	4¾ @
Colored	¾ @
Mixed woolens	@ 2½
Soft woolens	@ 5½
Gunny bagging	@ 4
Jute Butts	1¾ @ 2
Kentucky bagging	2¾ @ 2¾
Book stock	5¼ @ 5½
Waste paper and scraps	4 @ 4½
Rope cuttings	1 @ 1¼
Kentucky Bale rope	1½ @ 3
Oakum junk, No. 1	4 @ 4½
" No. 2	5½ @ 5¾
Grass rope	@ 4
Tarred Shaking	3½ @
White Collar Cuttings, all paper	1½ @
" " " muslin lined	2 @
" Envelope "	3 @
Hard White Shavings, No. 1	5 @
Soft " " No. 1	6½ @
White Shavings, No. 2	6 @
Mixed shavings, part white	5½ @ 6
Imperfections, No. 2, best folded sheets	4 @ 4¾
" " " 1, Heavy Stock	5 @
Book Stock, Mixed	4¾ @ 5
" " No. 2, light	3½ @ 4
Prints	2 @ 2¼
Pure Manilas	1½ @ 2
Bogus Manilas and Hardwares	2
Commons	1 @ 1¼
Binders' Board Cuttings	1 @
Straw Board Cuttings	1⅜ @ 2
	1¼ @ 1¾

Old Metal.

Copper	@ 19
Yellow metal	14 @ 15
Brass	13 @ 14
Heavy Composition	17 @ 18
Old lead, solid	6 @ 6¼
Tea lead	4½
Wrought iron	1½ @ 1⅝
Sheet iron	0¾ @
Cast iron	1 @ 1¼
Machinery iron	1¼ @ 1⅜
Zinc	5
Pewter, No. 1	17
" No. 2	10 @ 12
Spelter	5½ @ 6

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters	₱ lb 20c
" Ordinary	6c
" Ivory Drop, fair	15c
" " best	26c
Black Paint, in oil, kegs, 8c.; asst'd cans, 11	c
Blue, Prussian, fair to best	50 @ 75c
" " " " in oil	25 @ 65c
" Chinese, dry	33c
" Ultramarine	25 @ 30c
Brown, Spanish	1½c
" Van Dyke	9c
Carmine, 40	$12 00
Green, Chrome	15 @ 23c
" " in oil	13 @ 25c
" Paris, good, 36c; best, 40c	
" " in oil, 30c	45c
Mineral Paints	1¼ @ 4c
Orange Mineral	14½c
Red Lead, American	9½c
" English	10½c
" Venetian (N. C.) dry	2¾c
" " in oil, asst'd cans, 11c; kegs, 8½c	
" Indian, dry	10c
Rose Pink	13c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 26c
" R w	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	3½ @ 7½c
" " in oil	16 @ 22c
Vermillion, Chinese	1 95
" English	1 95
" Trieste	1 65
" American, Common	23c
White Lead, American, pure dry	10½c
" " " in oil	11½c
White, Paris, English, prime, in bbls. 2½ @ 2¾c	
Yellow Ochre, French	2½ @ 2¾c
" " in oil, asst'd cans, 11c; kegs, 8½c	
" Vermont, in casks 1½c	
" Chrome	17 @ 27c
" in oil	18 @ 28c
Zinc White, American No. 1 dry	8c
" " 1, in oil	11c
" French (Paris)	11 c
" " in oil	12 c

Oils.

Linseed Raw, ₱ gal. casks, 87c, bbls, 88c	
" Boiled, " 91c, " 93c	
Whale, Crude	
" Bleached Winter	
Sperm, Crude	1·65
" Winter, unbleached	1·85
" " Bleached	1·90
Seal, Extra Refined	
Lard, Pure Winter	
" Spring	1·00
Cotton Seed, Crude	60c
" Southern Yellow	65c
" White	
Neatsfoot, Winter, 70c @ $1·10	
Natural Lubricating, 38c @ 40c	

Sundries.

Asphaltum	9c
Benzine, ₱ gal.	16c
Chalk, Block	1½c
Dryer, Patent, Am'n, asst'd cans, 1½c.; kegs 9c	
" " English " " 9c	
Flocks	
Frostings	50c
Glue, White	33 @ 47c
" Sheet	20c
Glaziers' Points, Zinc	9c
Gum, Copal	36c
" Damar	25c
" Shellac, English	60c
" " " dark	20c
Litharge	10c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	4c
Putty in bladders	5½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	38c
Whiting, Spanish	1c

Glass.

French Windows—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	
6 x 8 to 10 x 15	$10·25	$9·25	$8·75	$8·00
11 x 14 to 16 x 24	12·00	11·00	10·00	9·50
18 x 22 to 20 x 30	15·00	13·50	12·00	10·50
15 x 36 to 24 x 30	17·50	15·25	12·50	
26 x 28 to 24 x 36	18·25	16·00	13·25	
26 x 36 to 26 x 44	20·00	18·00	14·50	
26 x 46 to 30 x 50	21·00	19·00	15·25	
30 x 52 to 30 x 54	22·50	20·25	16·25	
30 x 56 to 34 x 56	24·50	21·75	19·00	
34 x 58 to 34 x 50	26·00	24·50	21·50	
36 x 60 to 40 x 60	30·50	27·00	24·50	

DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15	$16·50	$15·00	$14·00	$13·00
11 x 14 to 16 x 24	19·25	17·75	16·00	15·25
18 x 22 to 20 x 30	24·00	21·75	19·25	
15 x 36 to 24 x 30	26·00	24·50	20·00	
26 x 28 to 24 x 36	29·25	25·75	21·25	
26 x 36 to 26 x 44	32·00	29·00	23·25	
26 x 46 to 30 x 50	33·75	30·50	24·50	
30 x 52 to 30 x 54	36·00	32·50	26·00	
30 x 56 to 34 x 56	39·25	35·00	30·50	
34 x 58 to 34 x 60	41·75	39·25	34·25	
36 x 60 to 40 x 60	49·00	43·25	39·25	

Sizes above—$12·00 per box extra for every 5 inches.

An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 80 united inches, will be charged in the 84 united inches bracket.

Discount 60 & 10 @ 60 & 15 %.

LIST OF HARDWARE DEALERS.

Having compiled a complete list of the **Hardware Dealers** in the United States, expressly for addressing circulars, I am prepared to receive orders for addressing **ENVELOPES, CIRCULARS, &c.** The printed address is cut from the list and stamped upon the envelope or wrapper, thus enabling me to address a great number in a short space of time, and at rates far below the prices usually paid for this work. It answers all purposes, and can be done for one-third the expense of addressing by hand. My list contains names of over 4000 dealers, each State, city and town therein, being complied separately. Wholesale Dealers and Manufacturing Co.'s, whose custom it is to send out circulars, price lists, &c., to the trade throughout the States, cannot fail to find my list and style of addressing a great advantage to them, as it is a great saving of both time and expense. It has been tried by a large number in the trade, some of whose names appear at the bottom or this circular, and to any of whom I would most respectfully refer. My rate for addressing is $2·50 per M. Envelopes, &c., sent to the address below, will receive prompt attention, and will be addressed and returned at once, or envelopes, &c., will be furnished at market prices. For further information, address,

CHAS. H. SMITH, No. 115 Broad St., N. Y.

REFERENCES.

Union Nut Co., 78 Beekman st, L. Boardman & Son, 82 Chambers St., Millers Falls Co., 78 Beekman St., E. M Boynton, 80 Beekman St., Yale Lock Mfg. Co., N. Y.

P. S.—Copies of my list will be forwarded to any address throughout the U. S. upon receipt of $3·50.

NEW YORK, February 26, 1874.

Hardware.

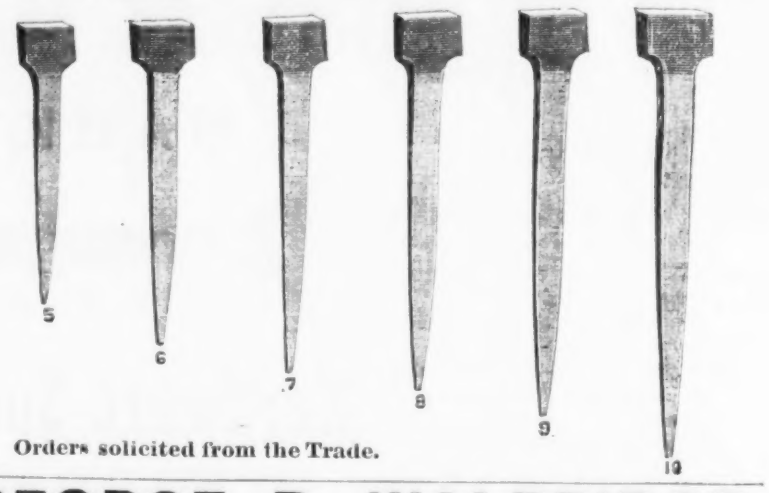
PRATT & CO.,

Hardware & Iron Merchants, Buffalo, N. Y.

Manufacturers of the Superior Brand,

BUFFALO FORGED HORSE NAILS.

These Nails are superior, being made with new and improved machinery and actually hammered from the best brands of **Norway Iron.**



Orders solicited from the Trade.

G

Grindstones, Emery, &c.

Walter R. Wood,

GRINDSTONES

283 FRONT STREET,

NEW YORK.

EMERY WHEELS AND MACHINERY

Upon which to run the same, of all kinds.

EMERY Emery Cloth, Mill Stone CEMENT. TRADE MARK. DIAMOND Tools, Oil Stones,

Soapstone Register Borders.

For particulars, address,

UNION STONE CO.,

6 Exchange and 26 Devonshire Streets, Boston, Mass.

THE TANITE COMPANY

Emery Wheels TANITE Emery Grinders

STROUDSBURG MONROE Co. PA.

EX INUTILI UTILITAS TRADE MARK

WILLIAMS WHITE & CHURCHILL,

Successors to

MACKRELL & RICHARDSON MFG. COMPANY,

Manufacturers of

Builders' Hardware,

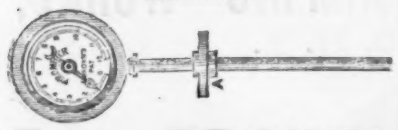
Locks, Hinges, Hooks and Staples,
Awning Hooks, Meat Hooks, Pincers,
Champion Noiseless Pulleys,
CHAIN PULLEYS, &c.

Factory, cor. Flushing and Nostrand Avenues
BROOKLYN.
Warehouse, 73 Warren St., N. Y.

PYROMETERS

for BLAST FURNACES.

E. BROWN'S STANDARD PORTABLE,
E. Brown's Improved
Gauntlet



Edw. BROWN,

311 Walnut St., Philadelphia.

ALSO FOR SALE

PYROMETERS

For Baker's Ovens, Boiler Flues, Galvanizing Baths, Oil Stills, Vulcanizers, Superheated Steam.

E. Brown's Portable Blast Gauge for the plug hole, Steam Gauges, Blast Gauges, Mercury Gauges, Recording Steam Gauges, Engine Counters, Indicators for ascertaining the Horse Power.

Over 300 "Gauntlett" and 100 Portable Pyrometers are now in use at Blast Furnaces.

Circulars on application.

Patent Automatic Muzzle.

him to bite.". The most humane invention of the age.

Manufactured by

W. T. & J. MERSEREAU, 82 Duane St., N. Y

Sold by all Hardware Dealers.

(From the *New York Times*, June 22.)

"Mr. Bergh has a muzzle that he recommends, as it does not PREY or WORRY the dog when on his head. By a spring the dog can open his mouth to the fullest extent, and running out his tongue, pant with as much comfort as though he was not muzzled, and drink without any difficulty, but it is impossible for

---

Bemis & Call Hardware & Tool Co.'s

This Wrench can be furnished with Briggs Pat. Nut or Sleeve.

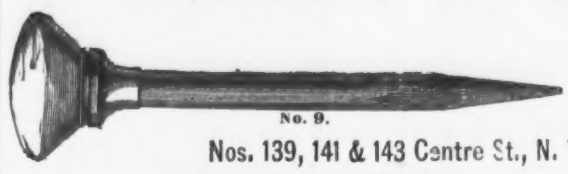
PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-Hardened throughout. And not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench. Thus making a Combination which has no equal.

For Circulars and Price List, Address,

BEMIS & CALL HARDWARE & TOOL CO. Springfield Mass.

MARKT & CO.,



No. 9.

Nos. 139, 141 & 143 Centre St., N. Y.

MANUFACTURERS AND IMPORTERS OF

Hardware Specialties,

DOOR KNOBS (Lava, Wooden, Porcelain & Mineral), SHUTTER, PICTURE AND DRAWER KNOBS,

Plate and Drop Escutcheons, Picture Nails and Curtain Pins,

BRIGHT WIRE GOODS,

Alarm Whistles and Mouthpieces,

FURNITURE NAILS,

Bright Halter & Coil Chains, French Wire Nails,

Wrought Iron and Brass Butts.

Having consignment of one of the largest German manufacturers of **Halter and Coil Chains**, we can offer inducements on these goods.

We shall be pleased to send our new lists and prices to those who will apply.

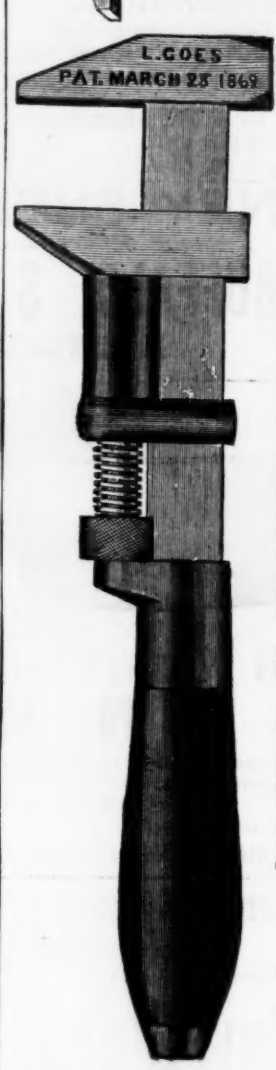
L. COES & CO.,

Manufacturers of

L. COES' Genuine Improved PATENT SCREW

WRENCHES,

Worcester, Mass.



Our Mr. L. Coes, formerly senior member of the firm of L. & A. G. Coes, established in 1839, is the Original Inventor of the Screw Wrench, and has, by making the bar *wider*, where the strain comes most severe, and screwing a nut up firmly against four *square* shoulders inside the ferrule, thereby *effectually* preventing the ferrule from being thrust back into the handle or getting loose, and making a larger screw than in the old wrench, fully succeeded in making a 12 inch wrench stronger than a 15 inch made in the usual manner. All sizes are made in this way, and are undoubtedly the strongest and best finished Screw Wrenches in the market.

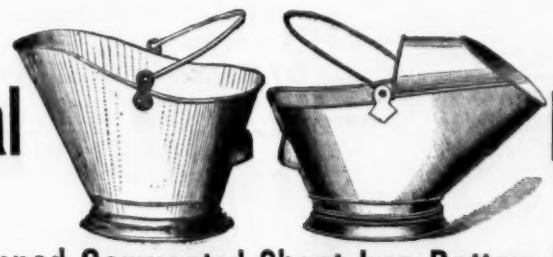
There are *Imitations* of our goods offered for sale, that, without question, infringe on our Patents.

We hold Patents bearing date Nov. 10th, 1863 (re-issued June 1st, 1869), June 26th 1866, March 23d, 1869 (re-issued April 12th, 1870, and May 14th, 1872), which fully cover all our improvements. One of the above cuts represents a sectional view, showing the nut under the ferrule, and the strengthened bar, that part being covered by the jaw, as seen in the cut of wrench complete. None genuine unless stamped

"L. COES & CO."

Warehouse, 97 Chambers and 81 Reade Streets, New York.

HORACE DURRIE & CO., Agents.

Coal  **Hods.**

Stamped Corrugated Sheet Iron Bottom Riveted.

We manufacture six styles having our patent corrugated bottom, and all having the body bottom and hoop **riveted** together. Dealers before buying will find it to their advantage to get our prices, and also to beware of a **seamed** hod that is in the market, somewhat similar in shape to ours. Don't buy any but the **Corrugated Riveted Bottom Hod**, manufactured by

SMITH, BURNS & CO., 46 Cliff St., N. Y.

Also Manufacturers of

Galvanized and Japanned Sheet Iron Goods, and Plain, Stamped and Japanned

TIN WARE.

FRY PANS, FIRE SHOVELS, ASH SIFTERS, &c. Send for Catalogue.

White Lead, &c.

John T. Lewis & Bros.,

No. 231 South Front St.,
PHILADELPHIA.

JOHN T. LEWIS & BROS. WARRANTED PURE WHITE LEAD. PHILADA.

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The Atlantic White Lead and Linseed Oil Company,

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Established 1782.

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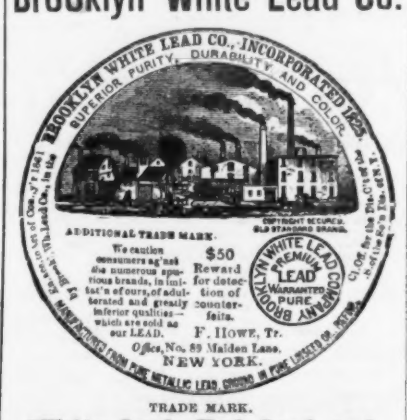
BROOKLYN WHITE LEAD CO., INCORPORATED 1825.
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ADDITIONAL TRADE MARK.
We caution consumers against the numerous spurious brands, in imitation of ours, of adulterated and greatly inferior qualities—which are sold as our LEAD.
$50 Reward for detection of counterfeits.
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Office, No. 89 Malden Lane.
NEW YORK.
BROOKLYN WHITE LEAD CO. PREMIUM LEAD WARRANTED PURE
MANUFACTURED FROM PURE METALLIC LEAD GROUND IN PURE LINSEED OIL

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Full assortment constantly on hand.

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Importers,

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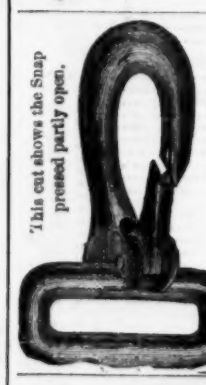

This cut shows the Snap pressed partly open.

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The Celebrated "Baldwin" Plane Iron,

HENSHAW'S PATENT HARNESS SNAPS

GERMAN HARNESS SNAPS,

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Plow, Fillettster & Dado Stops of all kinds. Set Screws for Plows, Bench Plane Starts, &c. Patent Washer Cutters. Plane Iron Screws to order of any size.

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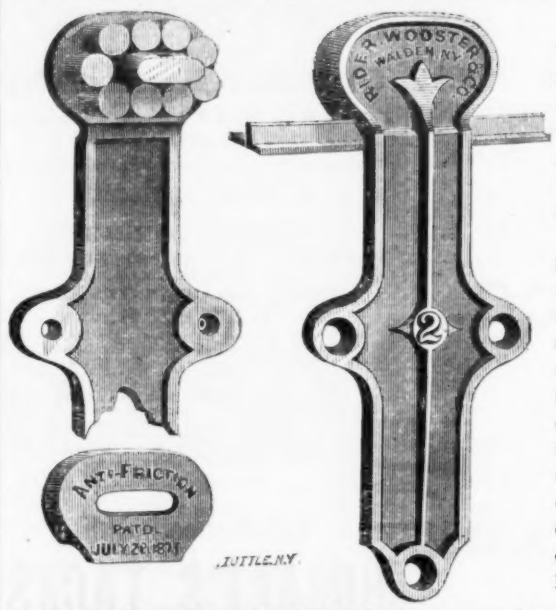
Wostenholm's IXL Pocket Knives & Razors, Butcher's Files, Tools, &c.

No. 93 Chambers Street, NEW YORK.

Anti-Friction Barn Door Hanger



This Hanger is entirely new in principle and design, and possesses marked advantages over all others, entirely obviating all the defects and annoyances hitherto experienced in the use of ordinary sheaved hangers.

In construction it is exceedingly simple, as will be seen by the cut. The weight of the door is supported by a strong stud, between which and the rail is a series of chilled iron rollers, inclosed by the front of the hanger and cap, and as these rollers pass under the stud, they are returned over it in succession. There is consequently no friction, except that of rolling surfaces. Its leading advantages are:

GREAT DECREASE OF FRICTION, moving (as determined by direct experiment) with **one-fourth the power required by any other Hanger in the world.**
Great Strength. Unlimited Durability.
No Axles and Sheaves to grind and break.
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Thorough protection from the weather.
It will not clog with snow and ice.
It cannot run off the track.
It causes the door to run perfectly true.
It cannot get out of order.
It is compact, Simple and Beautiful in design.

This Hanger will fit any ordinary rail, but our rail is preferable, from the fact that it has a double flange at the bottom, so that the screws will not work out and allow it to rock or tip over.

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No. 2 " " 6 inch and upward..... " 1·50
One Dozen Pairs in each case.—dis 30 per cent.
RAIL, with Double Flange.....per foot, 7 cents.
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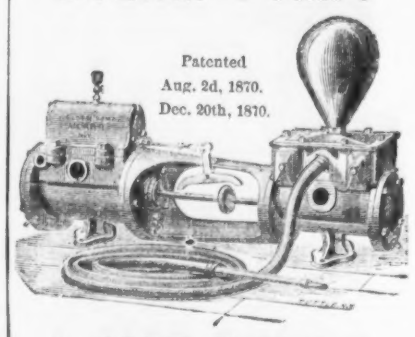
The Selden Direct-Acting STEAM PUMP.



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Dec. 20th, 1870.

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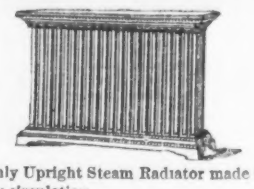

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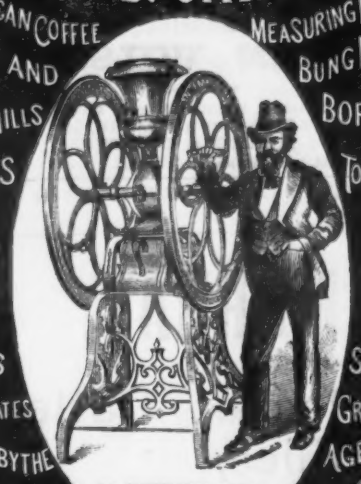

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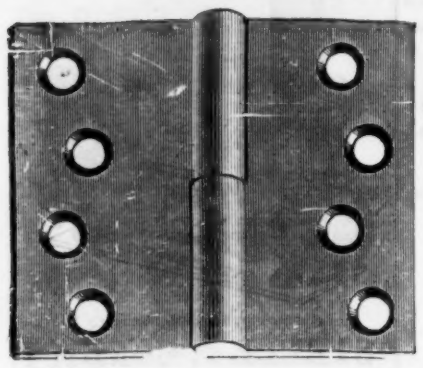

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5000 CASES

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Pail Handles

PACKED

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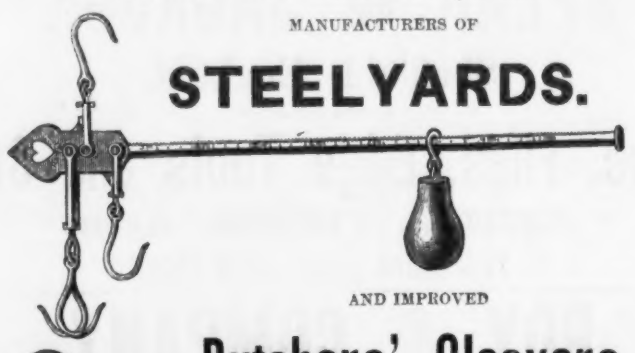

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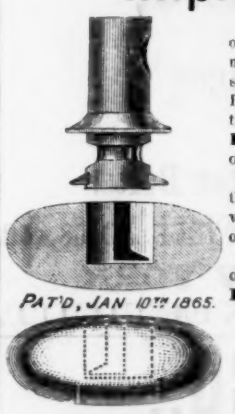
Butchers' Cleavers.

Our Steelyards embrace the English, Collins', Farmers' and the Hart Pattern. All warranted correct. **Our Improved Butchers' Cleavers** are made of the best Cast Steel, with strong Norway Iron Ferrules. Send for our Catalogue and Appendix. Price $4·50, and charge remitted on receipt of subsequent orders.

Improved Door Knobs.



On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED** and **MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See *The Iron Age*, of August 21st., page 11, for illustrated description of our patent **Telescope Locks and Latches**, with patent Flat **Steel Perforated Keys**,

Address

BRANFORD LOCK WORKS,

Branford, Conn.

Or, THE HART, BLIVEN & MEAD MANUFACTURING CO., Agents,

18 & 20 Cliff and 243 & 245 Pearl Streets, New York

Easily Applied and not Liable to get out of Order."—From Report of Judges at American Institute Fair, 1872.

CHALLENGE DOOR & GATE SPRING. PATENTED JULY 11TH 1871.

CHALLENGE DOOR & GATE SPRING. PATENTED JULY 11TH 1871.

The Challenge Door Spring Co.,

Patented. Exclusive Manufacturers of the [March, 1873

CHALLENGE DOOR & GATE SPRING. PATENTED JULY 11TH 1871.

CHALLENGE DOOR & GATE SPRING. PATENTED JULY 11TH 1871.

In Appearance the Most Beautiful. In Action the most Graceful. In Use the Most Reliable.

The Challenge Springs are manufactured from **Steel Wire, tempered by an Improved Process**, the result of repeated experiments, and must not be classed by dealers with the numerous worthless "Coil Springs" made from common Bed Spring Wire.

No. 49 Ann Street, NEW YORK.

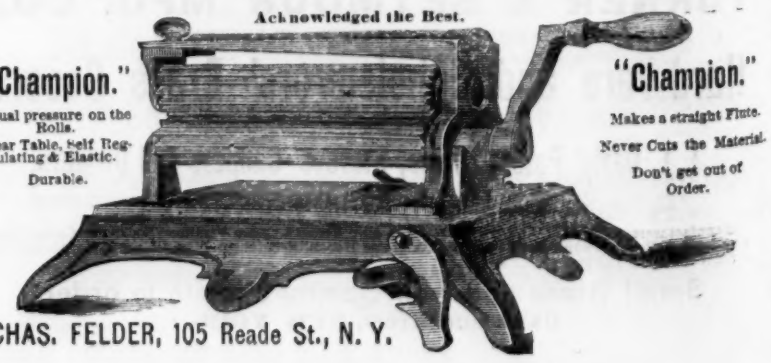
Acknowledged the Best.

"Champion."

Equal pressure on the Rolls.

Clear Table, Self Regulating & Elastic.

Durable.



"Champion."

Makes a straight Flute.

Never Cuts the Material.

Don't get out of Order.

CHAS. FELDER, 105 Reade St., N. Y.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.—Solid Cast Steel.....₩ ℔ 14c
Peter Wright's.....₩ ℔, gold, 12½c
Wilkinson's.....11½c
Eagle.....11 cents currency—dis 15 @ 15&5 %
Apple Parers.—Union.....per doz $8 00
Skeleton.....“ 8 00
Victor, Improved.....“ 8 00
Reading “ .....“ 8 25
Turn Table, “ .....“ 8 50
Bay State Paring, Coring and Slicing.....“ 12 00
Discount for 25 dozen lots.....“ 50c
Axes.—Mann's Light.....Per doz. $13 00 @ 12 50
Hunt's Light.....“ 13 00 @ 12 50
Red Indian, all sizes.....“ 12 50 @ 12 00
Red Chieftain, all sizes.....“ 13 00 @ 12 50
Crown Prince.....“ 13 50 @ 13 00
Augers and Auger Bits.—Pierce's Pat. Twist Bits.....dis 25 @ 30 %
Douglass' & Ives' Bits.....dis 30&10 %
Connecticut Valley Auger Bits.....dis 35&10 %
Cook's Bits.....dis 40&10 %
Jennings' Bits.....dis 10 %
Bates' Nut Augers.....dis 30&5 %
Douglass' & Ives' Augers.....dis 30&10 %
Watrous' Ship Augers.....dis 10 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearn's Patent Hollow Augers.....dis 25 %
Balances.—Landers Frary & Clark's.....dis 15 %
Chatillon's.....dis 15 %
Morton's.....dis 15 %
Common Spring with Hook.....₩ doz $1 38 @ 2 00
Bells.—Bevin Bros. Mfg Co. Light Hand Bells.....dis 60&10 %
Other makers light.....dis 65&10 %
Swiss Pattern Hand Bells.....dis 50 %
Connell's Door Bells.....dis 50 %
Great Western and Kentucky Cow.....dis 50&10 %
Boring Machines.—Bates' Mfg. Co., complete with augers.....dis 15 @ 20 %
Douglas' Mfg. Co., complete with augers..dis 15 @ 20 %
Common Boring Machines, no Augers.....$4 25 @ 4 00
Anguar, “ “ ..... 5 25 @ 5 00
Bolts.—Eastern Carriage Bolts .....special prices
Western “ “ .....
Philadelphia “ “ .....dis 30 @ 50&5 %
Wrought Shutter Bolts.....dis 50 %
Cast “ “ .....dis 50 %
Skelly's Phila. Norway iron, finish, points.....dis 50 %
Braces.—Barber's.....dis 40&5 %
Backus.....dis 45 @ 50 %
Bartholomew's American Ball.....dis 10&10 %
Spofford.....dis 40 @ 40&5 %
Butts.—Cast Fast Joint, Narrow.....dis 40 @ 40&5 %
“ “ Broad.....dis 50 @ 50&5 %
Cast Fast Loose Joint.....dis 50 @ 50&5 %
“ Acorn, Loose Pin.....dis 40&10 %
Wrought Loose Pin.....dis 35 %
“ Table Hinges and Back Flaps.....dis 30 %
“ Narrow.....dis 30 %
“ Loose Joint.....dis 35 %
“ Reversible.....dis 35 %
Parker's Blind Butts.....
Shepard's “ “ .....} dis 50 %—dis by the
Clark's “ “ .....} case 50&5 %
Cherrytree “ “ for wood. }
Lull & Porter's “ .....dis 40 %
Clark's Mortise Butts.....dis 40 %
Chains.—German Halter.....dis 15 @ 20 %
“ Coil.....dis 15 @ 20 %
Galvanized Pump.....₩ ℔ 15c
Best Proof Coil Chain—

₩ ℔...	15¾	10¾	10	9¼	9¼	9	8½c gold
	5-16	⅜	5-16	⅜	7-16	½	⅝ in.

By the cask, 560 lbs., discount ½c per lb. Common Chain, ¼c per lb. less than proof.
Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang “ .....dis 40 @ 40&10 %
Beaty's Framing and Firmer.....dis 10 @ 15 %
Casters.—Porcelain Wheel.....dis 30&10&5 %
Iron.....dis 30&10 %
Brass.....dis 30&10 %
Clothes Wringers.—Universal.....per doz $68 00
Novelty. “ 68 00
Reliance. “ 68 00
Providence “ “
Monitor. “ 68 00
Orders for 5 dozen, discount $1 per dozen.
King Wringers (Iron Frame).....per doz $68 00
Coffee Mills.—Common Box and Side.....dis 10 @ 15 %
Patent Box and Side.....dis 10 @ 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co. & .dis 60 @ 60&10 %
Concave Adjustable Handle.....dis 10 %
Beatty.....dis 10 @ 15 %
Fry Pans.
Tinned.....dis 20 %

₩ doz..	$3 00	3 25	3 62	4 00	4 50	5 00	5 50	6 00	7 50
No....	0	1	2	3	4	5	6	7	8

Burnished.....

₩ doz..	$2 80	3 00	3 38	3 75	4 12	4 50	5 00	5 62	6 25
No....	0	1	2	3	4	5	6	7	8

Files.
Nicholson Mill Files.... new list, $5 00 to £ cur dis 10 %
“ Bastard..... “ 5 00 to £ cur dis 10 %
“ Taper..... “ 5 00 to £ cur dis 10 %
Butcher's Mill.....$5 75 to £ gold
“ Bastard.....5 50 to £ gold
“ Taper.....5 50 to £ gold
Moss & Gamble—Mill, Taper and “ Bastard.....5 50 @ 5 25 to £ gold
Fluting Machines.
K. F. M.—4¾ in. rolls, $5 50.....dis 10 %
“ —6 in. rolls, $6 65.....dis 10 %
Mrs Knox—4 in. rolls, $5 50.....dis 10 %
“ —6 in. rolls, 6 65.....dis 10 %
Hammers.
Yerkes & Plumb's.....dis 10 %
Hammond & Son's.....dis 10 %
Yeres.....dis 10 %
Hatchets.
Beatty's.....dis 10 @ 15 %

Shingling and Half.	₩ doz...	$7 00	7 50	7 75	8 00
	No.....	1	2	3	

Yerkes & Plumb.....dis 10 %

Shingling and Half.	₩ doz...	$7 00	7 50	8 00	8 50
	No.....	1	2	3	4

Claw.....	₩ doz.	$7 50	8 00	
	No.....	1	2	3

Hinges.—Strap and T.....dis 25&10 %
Bonney's No. 1 Gate.....dis 25 %
“ No. 2 and 3.....dis 35 %
Horse Nails.

	Nos.	6	7	8	9	10
Ausable		27	25	24	23	22
Globe		28	26	25	24	23
Brundage		26	24	23	22	21
	Nos.	5	6	7	8	9	10
Putnam		32	28	26	25	24	23

On Ausable, Globe and Brundage 1000 ℔ lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise.....dis 45 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 50 %
Scandinavian Pad Locks.

₩ doz.....	$10 50	10 50	12 00	12 00	15 00	15 00	} dis 15 %
No.....	9	9½	10	10½	11	11½	
₩ doz.....	$18 00		18 00		24 00	22 00	} dis 15 %
No.....	12		12½		13	13½	

Trunk Locks.....dis 5 @ 10 %
Tubular and Rosgens Latches.....dis 25 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
“ “ Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Matrocks.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60 @ 60&10 %
Lincoln's “ .....dis 40 @ 40&10 %
Landers, Frary & Clark's Petroleum...dis 10 @ 10&10 %
Taylor's Petroleum Faucets.....dis 20 @ 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 10 %
Woodruff.....dis 10 %
Stowe.....dis 10 %
Hale's.....dis 25 %
Stuffers.....dis 10 %
Planes.—Auburn Tool Co., “Bench”. dis 35 @ 55&5 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 25&5 %
Evans Pat. Circular.....net
Plane Irons.—American.....list net
Butcher's.....gold £, $5 50
Pliers.—Philadelphia.....net
Pittsburgh.....net
Plumb and Levels.
Stanley Rule and Level Co.....dis 60&10 %
Wm. Johnson, (Stanley List).....dis 60&10 %
Rakes.—Cast Steel Garden.....dis 33⅓ %
Malleable Garden.....dis 33⅓ %
Wood Head Iron Teeth.....dis 30 @ 40 %
Rules.—Stanley Rule and Level Co.....dis 60 @ 60&10 %
Steven's and Hubbard's.....dis 60 @ 60&10 %
Steelyards.—American Pattern.....dis 15 %

₩ doz.....	$5 50	7 00	9 00	1 00	11 00	12 00
No.....	50	100	150	200	250	300

English Pattern.....dis 15 %

₩ doz.....	$7 00	8 67	10 67	12 67	14 67	16 67
No.....	50	100	150	200	250	300

L. F. & C. Excelsior.....dis 10 %

₩ doz.....	$9 00	10 00	12 00	15 00	18 00	21 00
No.....	50	100	150	200	250	300

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₩ doz. $11 00 net
Clipper No. 10, Boxed and Sharpened.....₩ doz $10 50
“ “ 8, “ “ “ 10 00
Common Scythes.....₩ doz $7 00 @ 10 00
Shears.—Steel and Iron, new list.....dis 50 %
Saw.—Disston's Cross Cut.....dis 12½ %
Disston's Hand.....dis 12½ %
W. McNiece's Pat. Cross-Cut & Circ'r, new list. dis 12 %
Boynton's Lightning, new list.....dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Feb. 1873.....dis 20&10 %
“ Back Strap “ .....dis 20&10 %
Oliver Ames & Sons.....new list dis 12½ %
Brady Shovel Co.....dis 12½&5 %
Sad Irons.—Richmond (polished face).per lb. 4¼c. net
Coquanock (polished face).....“ 4 c net
Stone.—Arkansas Oil, No. 1.....₩ ℔ $1 75
Turkey Oil, No. 1.....“ 1 00
Washita Extra.....“ 30c
“ No. 1.....“ 21c
“ “ 2.....“ 18c
“ “ 3.....“ 9½c
Screws.—Iron.....new list, Jan. 1st, 1874, dis 52½ %
Brass.....dis 5&½ %
Spoons.—
Plated Spoons, Rogers Bros.'.....dis 40 %
Britannia. Spoons.....dis 40 @ 40&10 %
German Silver.....new list dis 10 @ 15 %
“ Light.....new list dis 15&5 %
Lalance & Grosjean Iron.....dis 10 %
Springs.—Gray's Door.....dis 40 %
Perry's Door.....dis 40 %
Stocks and Dies......dis 15 %
Stove Polish.—Gem.....₩ gross, $5 00
Onyx.....“ $5 00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 50&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 72½ %
“ “ “ by the case...dis 72½&7½ %
Clout and Finishing Nails.....“ 7½ %
“ “ “ by the case.....dis 7½ %
Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation “ “ “ .....dis 30 %
Vises.—Solid Box.....₩ ℔ net 15c
Wrenches.—Coes Genuine.....dis 40 %
Coes Imitation Wrought Bar.....dis 50 %
“ “ Malleable Bar.....dis 60 %
“ “ (Kellogg) Malleable Bar.....dis 50 @ 10 %
Tafts Pattern (Wrought Bar).....55 %
“ “ Kellogg's (Nail Bar).....dis 65&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
“ “ “ Improved Baxter.....dis 25 %
“ “ “ Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....dis 37½ @ 40 %
No. 19 to 26.....dis 40 @ 42½ %
No. 27 to 36.....dis 45 @ 47½ %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 20 %
Galvanized Wire No. 0 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

July 25, 1874.

Augers—Snell Mfg. Co.....dis 20 %
Bits, Auger—Snell Mfg. Co.....dis 20 %
Bells, Cow—Yaw's Genuine.....dis 25 %
Bolts—Carriage and Tire.....dis 70&20 %
Braces—Bit, Spofford's Patent.....dis 40 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Patent.....dis 30 %
Butts—Brass.....dis 25 %
Cast Loose Joint.....dis 60 %
“ “ Pin.....dis 45 %
“ “ “ Japanned.....dis 45 %
“ “ “ Silver Tipped.....dis 25 %
Wrought Narrow.....dis 30 %
“ Broad, Loose Joint.....dis 35 %
“ Table and Back Flaps.....dis 30 %
Wrought Butts, Loose Pin.....dis 35 %
Belting—Rubber.....dis 30 @ 35 %
Leather new list.....dis 30 @ 30&5 %
Beaters, Egg, “Peerless”.....per doz $4 00
Brick—Bath (box of 2 doz) Best English.....$1 50
“ Rutherford”.....$1 00
Chalk—White, Carpenter's .....₩ gross, 50c
Red, Carpenter's .....“ 75c
Blue, “ .....“ 90c
Chisels—Firmer Socket.....dis 60&10 %
Framing Socket.....dis 60&10 %
Corner Socket Chisels.....dis 60&10 %
Slick's Carpenters'.....dis 60&10 %
Castings—Malleable .....₩ ℔ 10¾c
Cherry Seeders.....per doz $12 00
Clothes Wringers, “Novelty” No. 2.....₩ doz $62 00
Elbows—Corrugated..... 5 5½ 6 7 } dis 10 %
Charcoal.....$3 50 4 50 5 25 6 50 }
Russia..... 7 00 9 50 12 00 14 00 }
Files—Malschosa Bros.....dis 50 %
Freezers Ice Cream—“Champion .....dis 33⅓ %
Hammers—Henry W. Kip's.....dis 7½ %
Hinges—Window Blind—
Clark's.....dis 50&5 %
Shepard's and Standard.....dis 50&5 %
Wrought Strap and T.....dis 30&10 %
Hods, Coal—Plain, Black and Galvanized.....dis 10 %
Funnel, Black and Galvanized.....dis 10 %
Fancy and Helmet.....dis 10 %
Palace Coal Vases.....dis 10 %
Hooks and Staples—Wrought.....dis 60&10 %
Hooks—Belt .....dis 50 %
Hasps and Staples—Wrought.....dis 60&10 %
Sad Irons.....4c
Kettles—Brass.....₩ ℔ 50 @ 5c
Enameled.....dis 50 %
Knives, Drawing—Oval No. 1.....dis 60&10 %
Razor Blade.....dis 50&10 %
Lanterns “Peerless,”.....No. 1 5 10
₩ doz $26 00 $11 25 $13 75 dis 10 %
Gem, with guards.....$6 50
Tubular.....11 00
“ with Guards.....11 50
Machines—Apple Paring, “Turn Table”.....8 50 ₩ doz
Mills, Coffee—Box and Slide, common.....dis 10 %
Box Union and Eagle.....dis 10 %
“American .....dis 20 %
Nails—Clout and Finishing.....dis 7½ %
Shoe.....dis 7½ %
Horse, Ausable.....No. 5 7 8 9 10
27 25 24 25 22c
“ “ Finished & Pointed.....add 1c ₩ ℔
“ “ 1000 lbs.....dis 5 %
“ Clinton.....No. 5 7 8 9 10
22 20 19 18 17c
Packing—Rubber.....dis 30 @ 35 %
Pencils, Slate—Soapstone.....4 5 6in.
30 40 50c. ₩ 100
Case lots.....dis 20 %
Paint—White Lead, U. S. Gov't.....₩ ℔ 9 c
Rivets—Iron, Black and Tinned.....dis 25 %
Copper.....dis 10 %
Rope—Manilla, ¾ inch and larger.....₩ ℔ 15½c
Rules—Boxwood and Ivory, Stephens.....dis 60 %
Screws—“American Screw Co”—
Flat Head, Iron.....dis 52½ %
Flat Head, Brass.....dis 52½ %
Staples—Blind, Boardman's Pat., ⅓ & ¾.....₩ ℔ 37c
Spoons, Iron Tinned.....dis 10 %
“ by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 40 %
Britannia.....dis 40 %
Squares—Steel and Iron.....new list 50 %
Shoes, Horse—H. Burden & Sons.....₩ keg $6 00
Shovels & Spades—Shepard, Forsyth & Dennison..dis 20 %
Saws—Henry Disston & Sons.....dis 10 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Shears—Seymour's.....dis 60 %
Traps, Steel—Newhouse.....dis 20 %
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Vises—Parallel, Buffalo.....dis 20 %
Wrenches—Coes' genuine.....dis 40 %
Coes' Imitation.....dis 50&10 %
Tafts' Pattern.....dis 65&10 %
Ware—French, Tinned and Iron.....dis 25 %
Stamped and Japanned.....dis 10 %
Cast Iron Hollow.....dis 33⅓ %
Tin Plates.—Add for each X.....$1 00
10x14, IC, Charcoal ..$12 00 . 14x20 C. terne.....$10 75
12x12, “ ... 12 50 | 20x28 C. “ ... 21 75
12½x17, “ ... 11 50 | 20x28 X. “ ... 27 25
14x20, “ ... 13 00 |
Pig Tin—Straits.....30c @ 31c
Bar Tin.....32c
Solder.....No. 1, 17c; No. 2, 16c
Sheet Zinc—
“Lasalle”.....570 100 ℔ casks
$10 00 10 50 ₩ 100 ℔s
Sheets.....$10 00
Iron Wire—Bright and Annealed.....dis 37½ %
Coppered.....dis 32½ %
Tinned.....dis 15 %

Tinned Broom,	Nos. 20	21	22	} dis 20 %
	20c	21c	21c	

Copper—Sheathing 14 @ 18 oz.....₩ ℔ 33c
Planished.....₩ ℔ 39 @ 41c
Bottoms.....₩ ℔ 34c
Bolts.....₩ ℔ 35c
Braziers' Sheets.....₩ ℔ 37c
Sheet Iron.—
18 Common.....$5 00
24 Common.....5 00
24 W. D. Wood & Co., Smooth Finish.....6 10
Am. Russia.....A. B.
15c 12½c
Gen. Russia, No. 1 stained.....13c
“ “ clean.....12c
Galvanized.....dis 15 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.....$ @ 13 00
I. X. 10x14 Charcoal.....@ 17 00
I. C. Terne 14x20.....11 00 @ 13 00
I. C. Terne 20x28.....24 00 @ 25 00
I. C. Continuous.....26 00
Block Tin.....₩ ℔ 30c @ 31c
Solder.—S. & Co.....₩ ℔ 26c
Lead.—Pig.....₩ ℔ 7c.
Copper.—Ingot.....@ 46c
Planished.....“ @ 44c
Sheathing.....“ @ 35c
Copper Drops.....@ 30c
Zinc. Casq, 500 to 1000 lbs.....₩ ℔ 10 c
Case, 100 lbs.....“ 11 c
Slab.....“ 7½c
Brass.—Roll, No. 6 to 20.₩ ℔ 38c
“ 30 to 38. “ 42c
Babbit Metal.—Sellew & Co.....₩ ℔ 35c
Antimony.....₩ ℔ 17c
Bismuth.....₩ ℔ $4 00
Nickel.....₩ ℔ $4 50
Sheet Iron.—Gem Russia.....₩ ℔ 22c

	Com. B.	Fin. S. L. U.
15 to 20	4·4c	5·5c
22 to 24	4·6c	6·1c
26	4·8c	6·3c
27	5·0c	6·5c

Galvanized Iron.—Full bundles.....dis 30 %
Nos. 18 to 20.....12c
22 to 24.....13c
Bar Steel.—Silver, ₩ ℔ 16c; Crescent, 21c.
Iron Wire.....dis 33 %
Enameled Ware.....dis 45 %
One Piece Corrugated Elbows......dis 10 %

Charcoal Iron.		Russia Iron.	
4½ inch.....	₩ doz $2 50	4½ inch.....	₩ doz $5 00
5 “	“ 3 50	5 “	“ 7 00
5½ “	“ 4 50	5½ “	“ 9 50
6 “	“ 5 25	6 “	“ 12 00
7 “	“ 6 50	7 “	“ 14 00

Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %

₩ doz.		₩ doz
2-inch.....	$1 75	2½-inch..... $2 75
3-inch.....	2 25	3½-inch..... 3 25
4-inch.....	2 80	4½-inch..... 3 50

Sheet Iron Bread Pans.....₩ ℔ 10c
American Broilers.....₩ doz. $12 00
Tinmen's Machines.....dis 5 %
Sad Irons.....₩ ℔, 4 c
Brass Kettles.—Ansonia.....52c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent.

Iron, standard list assorted sizes, for large orders, 3c, card rate, 2 % off net.
Flat Rail (1¼x¼), punched and coun'sunk..4·4c ₩ ℔ net
Iron Wedges.....4½c ₩ ℔ net
Norway Nail Rods.....9¾c ₩ ℔ net
Crow Bars (in ordering please state whether “Wedge” or “Pinch” point).....5c ₩ ℔ net
Beetle Rings.....8¾c ₩ ℔ net
Fence Pickets—
⅝ round, bent to shape, 80c ₩ ft. of fence, less 15 % off net.
Discount off Standard List.
Carriage and Tire Bolts (new list).....70&10 % off net
Plow Bolts.....30, 10&5 % off net
Stove Bolts.....15 % off net
Machine and Square Head Bolts.....30&10 % off net
Coach and Lag Screws.....30&10 % off net
Bolt Ends.....35 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in.....7½c ₩ ℔ off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....6 c ₩ ℔ off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅜ in.....9 c ₩ ℔ off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅝ in.....7 c ₩ ℔ off net
Nuts and Washers in 25 lb. boxes, 1c ₩ ℔ ex. Nuts and Washers in lots less than one keg each size, 1c ₩ ℔ ex.
Nuts and Washers in 5 lb. boxes, 1½c. ₩ ℔ ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 3¼c ₩ ℔ net; ⅞ in. diam. 3¼c ₩ ℔ net; ¾ in. diam. 4c ₩ ℔ net.
Patent Headed Harrow Teeth, packed in casks, ½c ₩ ℔ ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5¼c ₩ ℔ net; 9-16 in. diam. 6¾c ₩ ℔ net; ½ in. diam. 7½c ₩ ℔ net. 1c ₩ ℔ extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ¾ to 1 in. diam. 9c ₩ ℔ net; ⅝ in. diam. 10c ₩ ℔ net; ½ in. diam. 12 c ₩ ℔ net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 36 in. long, 5½c ₩ ℔ net; 8, 10 & 12 in. long, 6¾c ₩ ℔ net
Strap and T Hinges.....30 & 10 % off net, delivery as customary.
For purchases amounting to $250 between May 20th and December 31st, 5 % extra off.
Screw Hitching Rings.....$5 25 ₩ 100 net
Duck Nest Tuyere Irons.....$14 50 ₩ doz net
Cast Iron Washers.....₩ ℔ 4c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₩ ℔ 4 c net
1 to 2 in. diam. from 4 to 8 ft. long.....“ 4½c net
1 to 2 in. diam. from 1½ to 4 ft. long.....“ 4¾c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long.....“ 4¾c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long“ 5¼c net
Bridge bolts with upset ends.....¼c. ₩ ℔ extra
Wrought iron plates, punched.....5c. ₩ ℔ net

WAGON HARDWARE.

Wagon Box Strap Bolts—

10 in. long by 7-16 at Screw End,	₩ set of	8	bolts..	55c
12 “ ½ “	“	8	“ ..	70c
10 “ 9-16 “	“	8	“ ..	90c
12 “ 9-16 “	“	8	“ ..	
14 “ 9-16 “	“	8	“ ..	$1 00
10 “ ⅝ “	“	8	“ ..	1 00
12 “ ⅝ “	“	8	“ ..	
14 “ ⅝ “	“	8	“ ..	1 10
16 “ ⅝ “	“	8	“ ..	1 20

5c ₩ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....18c
“ “ wide track, each.....20c
Single Tree Irons, ₩ set of four pieces.....38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set.....60c
“ “ 3 “ “ 65c
“ “ 3½ “ “ 70c
“ “ 3¾ “ “ 75c
Wagon Brake Ratchets, each.....16½c
“ “ “ finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
“ “ “ light “ each.....13½c
“ Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
“ “ “ “ 2, each.....10 c
“ “ “ “ 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 50 sets.....dis 25 %
Wagon Box Staples, 1¾ to 2¼ in. to clinch, ₩ 1000 $11 00 net
“ “ Bevel Box Iron, to rivet on, ₩ 1000 7 50 net
Neck Yoke Eyes, each.....4¾c net
“ “ with ⅝ rings, each.....7¼c net
King Bolts, ⅞, 1, 1¼, and 1¼ in. diam.....₩ ℔ 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths.....“ 8¼c net
Wagon Rivets, 3-16 in. diam., all lengths.....“ 9½c net
“ “ & Nails, in 5 ℔ paper boxes....₩ ℔ 1c extra
“ “ in 25 ℔ wood “ .....¼c extra
Wagon and Hinge Nails, ¼ in.....₩ ℔ 17 c net
“ “ “ 3-16 in.....“ 19 c net
Double Tree Plates.....“ 8¼c net
Coupling “ .....“ 5½c net
Tongue “ .....“ 9 c net
Neck Yoke Plates.....“ 11 c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₩ ℔ as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₩ ℔ 10¼c net. ¼ in., 11½c. net

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal
IC, 10x14.....$12 00
IX, 10x14.....14 75
XX, 10x14.....17 50
IC, 12x12.....12 50
IX, 12x12.....15 25
IC, 14x20.....13 00
IX, 14x20.....15 75
XX, 14x20.....18 50
XXX, 14x20.....21 25
XXXX, 14x20.....24 00
DC, 100 Plate.....11 50
DX, “ 14 25
DXX, “ 17 00
DXXX.....19 75
DXXXX 100 Plate..22 50
IX, 14x14.....24 00
IC, 10x14 W.....11 50
IX, 10x14 W.....14 25
Roofing Tin.—Best Char.
IC, Terne, 14x20.....$10 75
IX, “ 14x20.....13 50
IC, Terne, 20x28.....21 75
IX, “ 20x28.....27 25
Coke Tin.—
IC, 10x14 Coke.....$10 00
IX, 10x14, Coke.....12 75
IC, 14x20, “ 11 00
Sheet Zinc.—
Any width.....9¼c
Copper.—
Sheathing.....33c
Copper Bottoms.....34c
Planished Copper.—
Sheathing, 14x48.....41c
Boiler Size, No. 7.....43c
“ “ No. 8.....43c
“ “ No. 9 43c
Tinning ₩ sheet, 14x48 10c
“ “ No. 7 11c
“ “ “ 8 11c
“ “ “ 9 10c
Pig Tin.—
Large Pigs.....29c
Small Pigs.....29c
Bars.....30c
Solder.—No. 1.....17c
No. 2.....16c
Bright Wire...dis 47½ %
Sheet Iron.—
No. 18 Am. Com.....4 80
No. 24 Am. Com.....5 00
Pat. Am. Russia “A,” Nos. 24, 25 & 26.....14½c
Russia, Nos. 9, 10, 11 & 12.19c
Pat. Planished Russia.. c
Russia No. 9, 10, 11&12.... c
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $6 10
“ 21 to 24..... 6 80
“ 25 & 26..... 6 50
“ 21 to 24 Char'l.. 7 80
“ 25 & 26 “ .. 8 00

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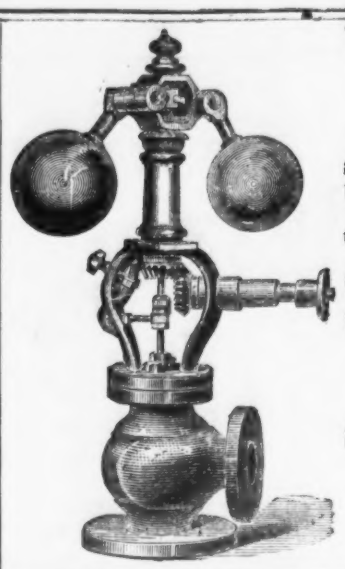

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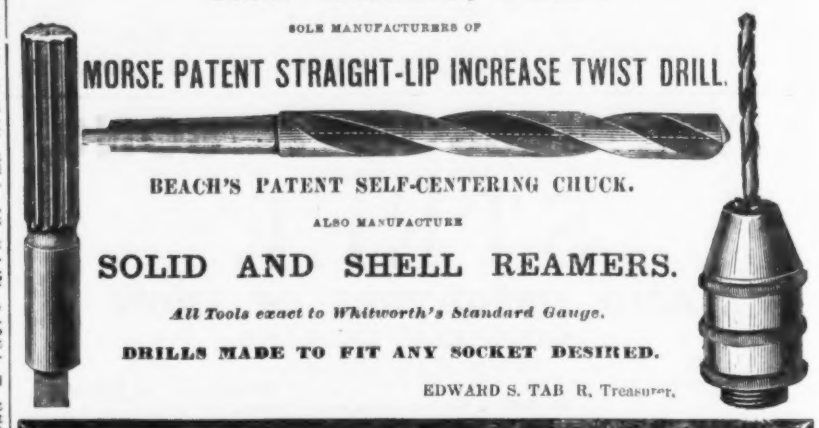

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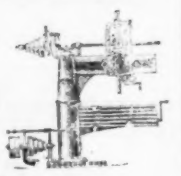

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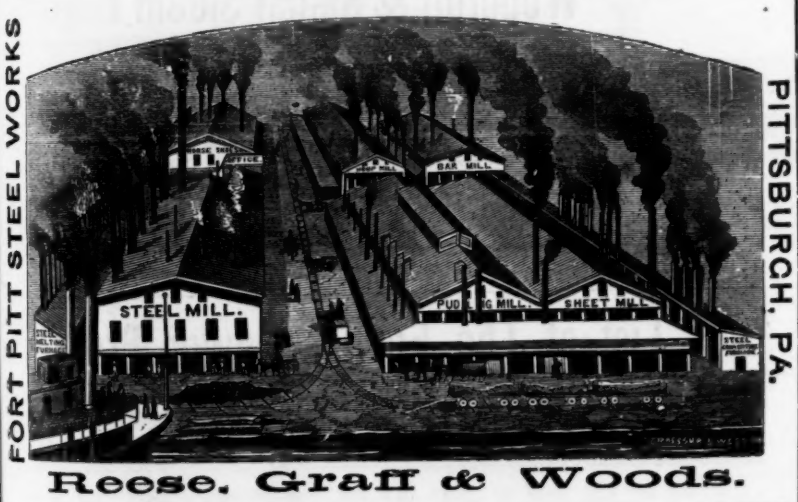

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Scythes—Dunn Edge Tool Co.....dis 30 %
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Scythe and Bush Snathes.....dis 25 %
Harvest Rakes and Barley Forks.....dis 25 %
Revolving Horse Rakes.....dis 25 %
Handles—Fork and Shovel.....dis 25 %
Cradles—Nithington, Cooley & Co.....dis 25 %
—Genuine Morgan.....₱ doz net $34 00

Augers and Bits.—
Ives' extra C. S....dis 30 % | Snell's.....dis 10 %
Jennings'.....dis 5 % | " Car Bits.....dis 10 %
Cook's.....dis 30 %

Axes.—Amoskeag Yankee.....₱ doz $12 00
Amoskeag Crescent..... " 13 00
Hunt's Bronzed..... " 12 00
Jefford's Silver Steel..... " 12 50
M. A. & Co. Clipper..... " 12 50
Mann's Red Warrior, Beveled..... " 12 50
" Double Bitt..... " 25 00
Handled Axes..... " 15 00
" " Boys..... " 12 00
Kennebeck..... " 11 00

Bolts.—Carriage and Tire.....dis 70 @ 10&5 %
Cast Barrel and Shutter.....dis 20&10 %
Wrought Iron Barrel.....add 10 %
" " Square.....net list

Butts.—Cast Fast Joint, Narrow.....dis 30 %
Cast Fast Joint, Broad.....dis 20 %
" Loose Joint.....dis 50&5 %
" " Pin, Reversible.....dis 40 %
" " Japanned.....dis 35 %
" " Silver Tipped.....dis 35 %
Wrought Narrow, Fast Joint.....dis 30 %
" Broad " .....dis 30 %
" " Loose " .....dis 30 %
" Loose Pin.....dis 30 %
" Table.....dis 30 %
" Brass.....dis 10 %
Garretson's Blind Butts, Wood.....doz sets $1 75
" " Brick.....doz sets 2 75
Parke's " Wood.....doz sets 1 85
" " Brick.....doz sets 2 75

Casters.—Iron Plate.....dis 25 %
Brass Wheel Plate.....dis 25 %
Porcelain Wheel Plate.....dis 25 %
" " Bed.....dis 25 %
Iron Wheel Bed.....dis 25 %

Chisels.—Butcher's Tanged Firmer.....dis 30 %
" Long Paring.....dis 30 %
Witherby Socket Framing.....dis 50&20 %
" " Firmer.....dis 50&20 %
" " Corner.....dis 50&20 %
" " Slicks.....dis 50&20 %

Coffee Mills.

Box 4 Iron	$ 3 75	Box 85 Cast Steel	$12 00
" 103 "	5 25	Side 50	4 75
" 102 "	6 25	" 60	5 75
" 107 Britannia	7 50	" 70	7 25
" 106 "	8 50	" 90	18 00
" 25 Union	10 50	" 15 Union	7 00
" 35 "	12 00	" 20 "	8 00
" 75 Cast Steel	10 50		

Cutlery.—American Table.....dis 20 %
" Pocket.....dis 25 %

Door Springs.—Torry.....₱ doz $5 00
Rubber..... " 4 00
Boon's..... " 5 00

Drawing Knives.—Witherby Tool Co....dis 50&20 %
Ohio Tool Co.....net list

Files.—Butcher's.....$7 00 £
Nicholson's.....$5 00 @ $5 50 £

Hammers.—Maydole's.....net list | Yerks & Plumb.....net list | Cheney.....net list

Handles.

Extra Axe	₱ doz. $3 00	Coal Pick, No. 1	₱ doz $2 00
No. 1 Axe	" 2 25	Sledge, No. 1	" 2 00
No. 2 Axe	" 2 00	Hatchet	" 65
R.R. Pick, No. 1	" 2 00	Hammer, A. E.	" 65

Hatchets.—

	1	2	3
Amoskeag Shingling	$7 25	$8 00	$8 75
" Claw	7 75	8 50	9 22
" Lath	7 50	8 25	
" Solid Steel			12 00

Hinges.—Strap and T.....dis 20&10 %
Screw Hook and Strap, 6 to 12 in.....8c. ₱ lb
" " 14 to 24 in.....6½c. ₱ lb
Hook and Eye Hinges.....net 12c. @ 16c. ₱ lb
Gate, No. 35, State.....₱ doz $3 50
" No. 3, In and Out..... " 3 50
" Bliss's Pat..... " 7 50

Hog Rungers.—Hil's Patent.....₱ doz $6 00
Hill's Patent Rings.....₱ 100, 25c
" Tongs.....₱ doz $3 00

Horse Nails.—Northwestern, 8d.....24c
Ausable, 8d.....24c
Globe, 8d.....26c

Kettles.—Brass.....5½c | Enameled.....dis 30&10 %

Locks and Knobs.—Norwalk Lock Co. dis 45 % | EagleLock Co.....dis 15 %
Branford " dis 45 % | Am. Pad Locks.....dis 35 %
" Comtal Lock Co. ..dis 10 %
Woodrun Patent ...net list
Stowe's Sausage Stuffers .....net list
Enterprise Patent...dis 5 %

Molasses Gates.—Stebbin's Patent ..dis 50 %

Nails.—10d to 60d.....per keg $4 00

Oil Stones.—Washita No. 1.....net 30c ₱ lb
Washita Slips.....net 60c " "
Hindostan No. 1.....net 9c " "
" Axe.....net 10c " "
" Slips.....net 15c " "

Picks and Mattocks.—Picks, Railroad, Axe Finish.....₱ doz $12 00
Picks, Coal, Axe Finish..... " 10 00
Mattocks, L. C., Axe Finish..... " 15 00
" S. C., " " ..... " 14 50
Grub Hoes, Axe Finish, No. 2..... " 1 00

Planes.—Ohio Tool Co., Bench.....dis 30 %
Sciota.....dis 35 %
A. Howland & Co., Bench.....dis 30 %
" Fancy.....dis
Bailey Patent Iron.....dis 15 %
Plane Irons, Butcher's.....dis 30 %

Rivets.—Iron.dis 10 @ 15 % | Copper, No. 7. net, ₱ lb, 50c
Tinned.....dis 10 @ 15 %

Rules.—Stanley Rule and Level Co.....dis 50&10 %
Hubbard & Curtiss Mfg. Co..dis 50&10 %

Sad Irons.—Best A No. 1.....₱ lb., 4c
" Copper Face Star.....₱ lb, 4½c

Sandpaper.
Baeder & Adamson's No. 0 to 1½...per ream, net $4 50
" " No. 2 to 3..... " net 5 00
Wiggins & Stevens, No. 0 to 1½.....₱ ream, net, $4 50
" " No. 2 to 3..... " " 5 00

Sash Locks.—Champion.....₱ gross, net, $12 00
Hopkins & Dickinson.....dis 10 %
Judd's Patent.....dis 10 %
Corbin's Patent.....dis 10 %
Clark's Patent.....dis 20 %

Saws.—H. Disston & Sons.....dis 10 %
Champion X Cut.....₱ foot, net, 60c
M. A. & Co. X Cut..... " " 50c
Lightning Cut..... " " 66c

Screws.—American Screw Co.—Iron...new list dis 50 %
American Screw Co.—Brass.....dis 50 %

Shovels and Spades.
Ames' Black Shovels.....₱ doz $14 50
" Polished " ..... " 15 50
" Patent " ..... " 18 00
Alling " ..... " 16 00
" " Molders'..... " 18 00
Crane's Black " ..... " 11 50
" Polished " ..... " 12 00
Smith's " " B. S. L. H. Rd. Pt..... " 13 50
" " " B. S. D. H. Rd. Pt..... " 14 00
Ames' Black Spades..... " 16 00
" Polished " ..... " 17 00
" Patent " ..... " 17 50
Alling " ..... " 16 00
Crane's Black " ..... " 12 50
" Polish'd " ..... " 13 50

Scoops.—Alling Steel Polished, No. 2.....₱ doz, $13 50
Alling Steeled Polished, No. 3..... " 14 00
" " " No. 4..... " 14 50
" " " No. 5..... " 15 50
" " " No. 6..... " 16 50
" " " No. 7..... " 17 50
" " " No. 8..... " 18 50
" " " No. 10..... " 21 50
Crane's Polished, No. 5..... " 13 50
" " No. 6..... " 14 50
" " No. 7..... " 15 50
" " No. 8..... " 16 50
Crane's Black Coal, No. 4..... " 17 50
" " No. 5..... " 18 00
Preston, Black Scoops No. 1..... " 12 00
" " No. 2..... " 12 50
" " No. 3..... " 13 00
" Half Pol. Scoops No. 1..... " 12 50
" " " No. 2..... " 13 50
" " " No. 3..... " 14 50
Lippincott, Half Pol. No. 2..... " 15 00
" " No. 3..... " 16 00

Wrenches.—Taft's.....dis 60 %
Coe's Imitation.....dis 50 %
Coe's Genuine.....dis 35 %

Wringers.—Novelty Clothes Wringer.....₱ doz $65 00
Universal Clothes Wringer..... " 69 00

Chicago Metal Market.

(Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.)

Tin Plate.—

10x14, IC, Ch'l. Com.	$11 50	14x20, IX, Ch'l Best.	$16 00
10x14, IC, " Best.	12 00	14x20, IXX, " "	19 00
10x14 IX, " "	15 00	14x20, IXXX, " "	22 00
12x12, IC, " "	12 50	DC. 100 Plate, " "	12 00
14x12, IX, " "	15 50	DX, " "	15 00
14x20, IC, " "	15 00	DXX, " "	18 0
Roofing IC, Charcoal, Best		DXXX, " "	21 00
Roofing IX, Charcoal "			11 50
10x14, IC, Coke			14 50
20x28, IC, Charcoal Roofing, Com			11 00
20x28, IC, " Good			22 00
20x28, IC, " Best			28 00
20x28, IX, " "			28 00
10x14, IC, Coke Plates			10 50
14x20, IC, "			11 00
10x20, IC, "			18 00

Block Tin.—Large Pigs.....30c | Bars.....32c
Small.....31c | Straits, 3c. higher.

Zinc.—Sheet, 500 to 1000 lb. Casks.....10c
Loose Sheets.....10½c
Slab Zinc or Spelter.....6½ to 7½c

Copper.—Bottoms.....34c
Sheathing.....33c
Planished.....41c
" Boiler lengths.....42c
Ingot.....32c to 28c
Bolt.....35c to 40c

Solder.—F. S. & Co.'s make.
Best Fine.....22c | Roofing.....18c
No. 1.....20c

Antimony.....18c

Babbit Metal.—F. S. & Co.'s.....16c
No. 2.....14c

Galvanized Iron Conductor Pipe.....₱ ft 10c

Sheet Iron.—

	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata.
No. 24	5 c	6 c	7¾c	9¼c
25 & 26	5¼c	6¼c	7¾c	9¼c
27	5½c	6½c	7¾c	9¾c

Galvanized Iron.....dis 15 %
No. 16 to 20.....12c | No. 24.....15c
21 to 24.....13c | 28.....16c
25 & 26.....14c

Russia Iron.—No. 1 Stained.....19c
Perfect.....20c | In Sheets, 1c. higher.

American Russia.—A.....15c | B.....12½c
In sheets, 1c higher.

Lead.—Pig.....7½c | Lead Pipe, in full coils.....8¼c
Bar.....8½c | Lead Pipe, when cut.....8½c
Sheet Lead.....8½c

Wire—Bright.....dis 30 %
Coppered.....dis 25 %

BOSTON.

(Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.)

Apple Parers.—Reading.....per doz $8 00

Augers.—Watrous Ship.....dis 10 %
L'Hommedieu Ship.....dis 15 %

Axes.—Forester's Favorite, Bronzed.....$12 50
Blue Jackets, Blue..... 12 00
Excelsior, Black..... 11 50
Chopper's Pride, Bronzed..... 11 00
Red Cross, Red..... 10 50
Red Cross, Handled..... 13 50
Boy's Handled Blue Jackets..... 12 00

Axe Handles.—Wadleigh's Oak—
A (Extra) $2·50. B (No. 1) $2·00. C (No. 2) $1·50 ₱ doz

Blind Hinges.—Washburn's.....per hundred set $9 50

Blind Fasts.—Washburn's.....per hundred set $5 75

Bolts.—Carriage. Phila.. "Girard Works.....dis 50&5 %

Borax.—Best Refined.....₱ lb 16c

Borers.—Angle. Backus'.....dis 30 %

Boring Machines.—Angle.....each $4 75
Common. Snell's quality.....each 3 75

Braces.—Barber's.....dis 40&5 %
Backus'.....dis 50 %
Spofford's.....dis 40 %

Brass Faucets.—L. F. & C.....dis 25 %

Butts.—Union Drilled Loose Joint.....dis 60 %
" " Wire Fast Joint.....dis 50 %
" " Acorn Loose Joint...dis 50&10 %
Brass Butts.....dis 30 %
Wrought Table Butts and Back Flaps.....dis 30 %
Wrought Narrow Butts.....dis 30 %

Cartridges.—"U. S. Cartridge Co."....dis 50 %

Chisels.—"Buck Bros.' Shank Goods.....add 20 66 22½ %
Socket.....add 22½ @ 25 %

Compasses and Dividers.—Bemis'.....dis 35 %
P. S. & W.....dis 25 %

Cordage.—Manila (usual trade dis.).....₱ lb., 16c
American Tarred Hemp Lath Yarn.....₱ lb., 10c

Corn Hooks.....per doz $2·75

Crow Bars.—Iron, Steel Points.....₱ lb., 3¾c
"Sweet" Steel Bars.....₱ lb 11c
Brown's Steel Bars.....₱ lb 10c
K. P. & Co. Extra Drill Steel.....₱ lb 15c

Dividers.—Cook's Nickel Plated.....dis 15 %

Door Springs.—Stimson's Patent.—
No. 7, Light inside doors, $12·00.....dis 25 %
No. 8, " outside " $18·00.....dis 25 %
Torrey's.....$4·00

Emery.—Alden.....₱ lb 7c
Wellington Mills.....₱ lb 11c

Files.—Earl Smith & Co.'s English.....$5 to £ gold
American.....$5 to £ currency, less 10 %
Nicholson.....$5 to £ currency, less 1.½ %
" Regular Taper.....dis 12½&5 %
Stubb's Tapers, genuine, 8 in., $1·50; 3½, $1·62; 4, $1·88; 4½, $2 13; 5, $2·50.

Funnel Irons.—$2·50 2·50 2·50 3·25 per doz
5, 5½, 6, 7 inch.
Deep Flange.—$3·50 3·75 4·00
5, 5½, 6 inch.

Hammers.—Maydole, new reduced list, July 1st, 1874.....dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $7·75 $11: 1½, $9·75. " " " " " bell face, No. 1,

Hangers & Rollers.—Novelty.....dis 30 %
Anti-Friction.....$1 75 per pair—dis 30 %

Hatchets.—Underhill Edge Tool Co.....dis 10 %
Underhill pattern, solid, C S. lathing.....$9 00
Underhill Bros. pattern, solid C. S. Lathing.....10 00
C. F. Dowse, warranted Cast Steel—
Shingling.....0, $4·75; 1, $5·25; 2, $5·75
Claw.....1, 5·75; 2, 6·25
Lathing.....1, $5·50
Axe Pattern.....1, $7·00; 2, 7·50
Broad....0, $5·75; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75; 5, $12·75; 6, $14·75.

Hinges.—Strap and T, Stanley Works.....dis 20&10 %
Plate, Loose and Fast Joint.....₱ lb 7½c
Wrought Screw Hook.....₱ lb 8c

Hoes.—Ely Balch & Co. M., B. & D.'s list, 1874...dis 25 %
Remington, M., B. & D.'s list, 1874.....dis 30 %

Lead.—Sheet and Pipe.....7½c—less 10 %

Locks.—P. & F. Corbin.....new list dis 45&5 %
Nashua.....dis 45&5 %

Manure Forks.—
Myers & Ervien, M., B. & D.'s list, 1874.....dis 25 %
Peck, Clark & Co., " " .....dis 25 %
Shumway & Co., " " .....dis 30 %

Mattocks.—K. P. & Co., axe finish, long cutter..$13 75
Short cutter.....13 50

Metal.—Babbitt. No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ₱ lb

Nails.—10c. and larger.....$4 00

Padlocks.—Wilcox.....dis 50&2 %
All Brass. 2½ inch. 2 keys. job lot.....$9 00

Picks.—K. P. & Co., Polished Points—
5 to 6.....per doz $9 00; 6 to 7, $9 50

Pins.—Universal Hat and Coat—
All wood, 2 in.....₱ gross $2 50; 3 in., 3 50; 4 in., 4 50

Potato Digger.
"Partridge," 6 square tine.....₱ doz $12 00
Shumway & Co., 6 round tine..... ₱ doz 9 00

Pulleys.—Clark & Co.'s Axle, 2 in.....per doz 42c

Plated Ware.—Rogers Bros.....new list dis 40 %

Plumb & Levels.—"Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels.....dis 50 %
No. 2, First Quality Levels.....dis 60&10 %
No. 3, Iron Pocket " .....dis 35 %
No. 4, Level and Plumb Glasses.....dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge.....dis 50&10 %
No. 6, Improved Iron Bench Planes.....dis 20&10 %

Pocket Knives.—Conn. Cutlery Co.....new net list

Rakes.—Cast Steel, garden.....dis 30 %
Malleable.....dis 25 %

Rail Road Door.—For Novelty and Anti-Friction Hangers.....per foot 7c., dis 10 %

Rivets.—Black.....dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8.
13 13 14 14 15 16c ₱ lb net

Sad Irons.—Bliss & Drake.....₱ lb 4½
Sand Paper—0 to 2, $4·25; 2 to 3, $4·75..new list dis 10 %

Saws.—Disston's.....dis 12½ %
Lightning X cut, Boynton's.....per foot 6½c
" Saw Blades, 32 inch.....per doz $7 00
" Framed Saws.....per doz 8 50
Common " .....per doz 6 00
Disston " " .....per doz 9 00
One man X cut.—Lightning.....$2 75 each
Disston's $3·00 each.....dis 12½ %
Wheeler, Madden & Clemson.....dis 15 %
" " " Mill.....dis 25 %
" " " Circular.....dis 25 %

Screws.—American Screw Co.....revised list dis 52½ %

Scythe Stones.—
"Willoughby Lake," first quality.....₱ gross $6·50
" " second quality.....3·00

Shovels.—O. Ames.....new list dis 12½ %
M. B. & D.....new list dis 12½ %

Spading Forks.—M. & E.....dis 25 %

Stone Pickers.—"Partridge," original...₱ doz $15 00

Tools.—Aiken's Pattern, 20 in set; Miller's Falls, $12·00 per doz.....dis 15 %

Traps.—Oneida.....dis 20 %
Blake's.....dis 20&5 %

Vises.—K. P. & Co.'s Solid Box, Blacksmith...₱ lb 14½c
Parker's Parallel.....dis 10 %
Backus.....dis 35 %
"Howards." Parallel.....dis 20 %

Wardrobe Hooks.—Wire to drive.....₱ gross $1 00

Weights.—Window Weights.....₱ lb 2½c

Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black.....₱ ft 6c

Wrenches.—Genuine Wrenches, A. G. Coes...dis 40&5 %

Wringers.—{Novelty and Universal} Tub No. 2 .....per doz $67 00
Novelty Bench, No. 4.....per doz 104 00
Eureka.....per doz $60 00

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz.)

Tin Plates.—₱ box
I. C. Char. 10x14 @ $10 00
I. C. Coke 10x14.....9 50
Char. Roof. IC, 14x20.11 25
Coke " IC, 14x20, 10 25

Pig Tin.—₱ lb
Banca.....30c
Straits.....26c
English.....24c

Zinc.—Sheet.....₱ lb 9½c

Iron.—Sheet Iron, Russia.....18c
Sheet Iron, English.....5 c
" " American Refined.....5½c
" " Galvanized.....10c
Plate Iron.....4
Swedish and Norway Bar Iron, gold.....₱ ton, $122 50
" " Shapes, gold..... 130 00
Norway Nail Rods, first quality, gold.....145 00
" " second " 135 00
Best Refined Bar Iron..... 67 50
The "Burden Best" Iron..... 105 00
American Pig Iron, Foundry, No. 1, x..... 35 00
" " No. 2, x..... 33 00
" " Gray Forge..... 30 00
Scotch Pig Iron.....₱ ton 37 00 @ 40 00
Wrought Scrap Iron..... 25 00

Steel.—₱ lb
Eng. Tool.....18c
American Tool.....15c
" Mach.....10½c
Remsemer.....7½c

Copper.—₱ lb
Sheathing.....33c
Bolt.....34c
Ingot.....20½c

Lead.—₱ lb
Pig.....6½c
Sheet and Pipe.....7 2c

Spelter......₱ lb 8c

Antimony......₱ lb 14c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co

Anvils.—Armitage.....₱ lb, gold 16c
Peter Wright's..... " 14c
Wilkinson's..... " 12½c

Apple Parers.—Conqueror.....₱ doz, $9 00
Lightning..... 9 00
Turn Table..... 9 00

Axes.—Hunt s.....₱ doz $13 00 @ 18 50
Lippincott's..... " 12 00 @ 18 00
Lippincott's Pioneer..... 13 00 @ 13 50
Simmons'..... " 12 00 @ 18 00

Axles.—Kritch & Crane Mfg. Co. s—
Patent Taper Axles.....new list net
Swelled Taper Axles.....new list net
Concord Axles.....new list net
Red Jacket Axles.....new list net
Common Axles, 1¼ inch and upward.....₱ lb 8¼c
" " less than 1¼ inch..... " 8¾c

Bellows.—"Best St. Louis make" 60c ₱ in. dis 20 %

Bells.—Troy, Church.....₱ lb, 50c
Light Brass, Hand.....dis 50 %
Moore's, Cow.....dis 20 %

Bolts.—Arms, Bell & Co.'s Machine.....dis 20 %
Arms, Bell & Co.'s Carriage and Tire.....dis 75 %

Cast Butt Hinges.—Western Butt Co.'s—
Narrow Fast Joint.....dis 33 %
Broad Fast Joint.....dis 50 %
" Loose " .....dis 60 %
Reversible.....dis 50 %
" Japanned and Silver Tipped.....dis 45 %
Loose Joint "Acorn" " " .....dis 55 %
Lull & Porter's Blind.....dis 50 %

Wrought Butts.—Narrow.....dis 25 %
Reversible.....dis 30 %
Broad.....dis 30 %

Chain.—Eng. Coil. 3-16 15, 1/4 11, 5-16 10, 3/8 9½, 7-16 8c, 1/2 in. gold
Trace.....6½-10-2 c "
7-10-2 70c "
German Coil and Halter.....revised list add 10 %

Chisels.—Socket, Firmer or Framing.....dis 60 %

Clothes Wringers.—Crown.....₱ doz $60 00
Novelty..... " 69 00
Universal..... " 69 00
Monitor..... " 69 00

Corn Cutters or Hooks.—Solid Steel....₱ doz $4 00

Corn Knives.—Dunn E'ge T'ol Co.'s Clip..₱ doz $5 75
Disston's..... " 6 00

Crow Bars.—Steel Pointed.....₱ lb 7c

Cutlery.—J. Russell & Co.'s.....
Lamson, Goodnow & Co.'s..... } new list, dis 15 %
Landers, Frary & Clark's.....

Files and Rasps.—
Nicholson's Files.....$5 00 less 5 %
Butcher's Mill.....$6 75
Heller's & Bros Horse Rasps.....dis 40 %

Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 30 %
" " Handled Hoes.....dis 30 %
" " Planter Eye Hoes.....add 15 %
Winsted's Planter Eye Hoes.....add 15 %

Hammers.—Yerkes & Plumb.....dis 5 %
Masons' Hammers.....₱ lb 20c
Smith Hand Hammers..... " 38c

Handles.—Axe.....Extra. $2·75 No. 1. $2·25 No. 2. $1·75 No. 3 $1·00
Pick.....Extra. $2·50 No. 1. $2·00 No. 1½. $1·75 No. 2 $1·25
Smith & Montross Fork, Hoe and Rake.....dis 20 %

Harrow Teeth.—1 inch iron.....₱ lb 4½c
⅞ and ¾ inch iron..... " 4¾c
⅝ inch iron..... " c
Barbed or Headed.....½c extra

Hatchets.—Hunt's.....dis 10 %
Simmons'.....dis 15 %

Hay Knives.—Lightning.....₱ doz $20 00
Dunn Edge Tool Co.'s.....₱ doz $14 50—dis 15 %
Fisher's..... " 16 50—dis 10 %

Hinges.—Strap and T—St. Louis make.....dis 25 %

Horse Nails.—Ausable.....22c rates
Northwestern.....22c " "
National Patent Pointed.....21c " "
" " " Extra Finished.....22c " "

Horse Shoes.—R. I. (Perkin s pa.....₱ keg $6 5
Burden's..... " 6 50
Mule Shoes..... " 7 50
Rhode Island Trotting Shoes..... " 9 00

Locks and Latches.—
Jones & Nimick s.....revised list dis 40 %
Moorhead, Adams & Co.....revised list dis 40 %
Norwalk Lock Co.'s.....revised list dis 40 %

Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....₱ doz. $14 75 @ 15 25
" Grub Hoes, Oval Eye....₱ doz. 10 75 @ 12 00

Nails.—Wheeling.....$3 75 rates.
Orders for 100 kegs 10c ₱ keg less.

Picks.—Klein, Logan & Co.'s R. R. and Clay ₱ doz.$11 00
Klein, Logan & Co.'s Coal..... " 8 50
" " Poll..... " 11 00
" " Stone..... " 14 50
" " Tamping..... " 17 00

Planes.—Ohio Tool Co.'s.....dis 30 %
Sciota.....dis 40 %

Post Hole Augers.—Clark's Patent—
No. 1, ₱ doz. $27; No. 2, $30; No. 3, $32.....dis 30 %
Barton's Patent.....₱ doz $25—dis 20 %
Vaughn's " " " " " " " 25—dis 10 %

Sad Irons.—Monitor Brand. Silver Polished..₱ lb 4c

Sash Weights.—Standard Solid Eyes.....₱ lb 3¾c

Saws.—Disston's.....dis 10 %
Hubbard, Lippincott, B. & Co.'s.....dis 10 %
Branch, Crooks & Co.'s.....dis 15 %
Livingston's Patent Buck.....net list

Screws.—American Screw Co.'s revised list....dis 50 %

Scythes.—
Dunn Edge Tool Co.'s.....new list dis 25 %
Paris Furnace Co.'s.....dis 20 %

Scythe Stones.—No. 1 Ind'n Pond ₱ gr's, $7 00
Extra Indian Pond..... " 7 50
Premium..... " 9 50
Diamond Grit..... " 13 50
} dis 25 %

Shovels, Spades and Scoops.—
Ames'.....dis 7½ %
Lippincott's.....dis 20 %
Rowland's Maxwell.....revised list dis 15 %

Sledges.—Smith s Stone or Coal Sledges—
Steel Face Polished.....₱ lb, 15c
Solid Cast Steel..... " 8 c

Snaths and Cradles.—Seymour Mfg. Co.'s..dis 25 %

Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 10 %
Blue Seat Springs.....new list dis 15 %

Tacks.—Norway Tack Co.'s ½ weight.....dis 72½ %
Brads ½ weight.....dis 50 %

Thimble Skeins.—Pump & Skein Co.'s...dis 50&10 %

Traps.—Newhouse Patent.....dis 15 %

Vises.—Solid Box.....₱ lb 16c
Wilson Mfg. Co.'s.....dis 15 %

Wrenches.—Coes' Genuine.....dis 35½ %
Coes' Pattern.....dis 50 %
Taft's.....dis 60 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co,

Tin Plate.

IC, 10x14, Charcoal	$12 00	IC, continuous, 20 in. x 28·0 ft.	
IX, 10x14, "	15 00	IX, continuous, 20 in. x 28·0 ft.	
IC, 12x12, "	12 50	IC, 10x14, best Coke	$11 00
IX, 12x12, "	15 50	IC, 10x14, good "	10 50
IC, 14x20, "	13 00	IC, 10x20	17 50
IX, 14x20, "	16 00	IC, 14x20	
IC, 14x20, Terne	11 50	IC, 14x20, Coke Lead.	
IX, 14x20, "	14 00	IC, 10x14, punch'd for Safes	
IC, 20x28, "	23 00		
IX 20x28, Terne	28 00		

Block Tin.
Large Pigs.....30c | Bars.....32c
Small " .....31c |

Sheet Zinc.
Casks.....₱ lb 10 c | Sheet.....₱ lb 11

Solder.
No. 1, Refined, in bars or plate.....$17 00
No. 2, " " " 18c
Pig Lead.....16c

Sheet Copper.—18 to 100 lbs. Sheets 30x60.....35c
14 to 16 lbs., Sheets 30x60..... " and 20x72.....36c
6 to 9 lbs., " 41c
Tinned, 14 and 16 oz. 14x48.....5 c
Planished, 14 and 16 oz. 14x48.....41c
" No. 7, 8 and 9.....42c
Copper Bottoms.....37 c

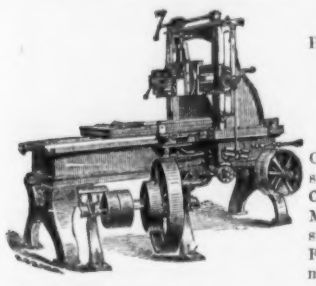
Sheet Iron.—

	Com'n.	Sm'th.	Char'l.	Jun'ta.
No. 16 to 20	4½c	5½c	7¼c	9¼c
No. 22 to 24	4¾c	5¾c	7¾c	9¾c
No. 26	4¾c	5¾c	7¾c	9¾c
No. 27	5 c	6 c	7¾c	9¾c

Galvanized Iron.....dis 30 %
Iron Rivets.....dis 25&7½ %
Iron Wire.....
Copper Rivets and Burs.....dis 35 %
Russia Iron.—Nos. 9, 10, 11 and 12. ₱ lb.....20c
No. 1 stained, ₱ lb.....19c
Imitation Russia, ₱ lb.....14c

The Pratt & Whitney Co.,

Hartford, Conn.,



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Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

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MAKER AND PATENTEE OF

Hydraulic Jacks and Punches,

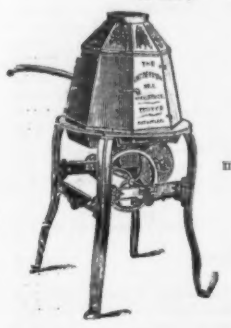
ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order.

The "EMPIRE" Fan Blowing Portable Forges,



With or without Hood.

(Patented Nov. 25, 1873.)

WITHOUT BELTS OR BELLOWS.

It is more **Easily Worked**, gives a **Better Blast**, and is the **Cheapest** Forge made.

☞ **IT HAS NO BACK DRAUGHT.**

Manufactured by W. P. KELLOGG & CO., Troy, N. Y.

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N. Y. Depot for **Curry Combs, &c.**, with F. WIEBUSCH, 84 Chambers Street.

N. Y. Depot for **Forges**, with GEO. PLACE & CO., 121 Chambers & 103 Reade Streets.

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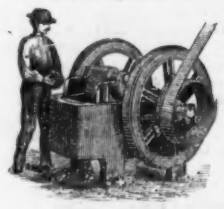
New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

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Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

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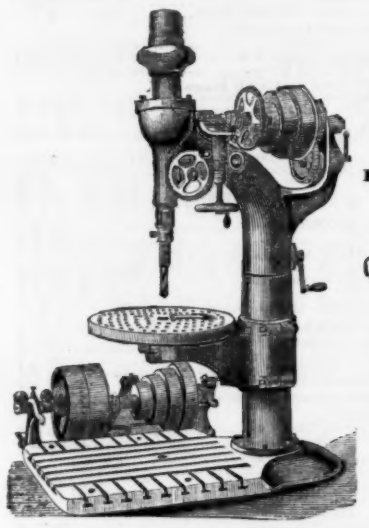

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From twelve (12) to forty-eight (48) inches swing;

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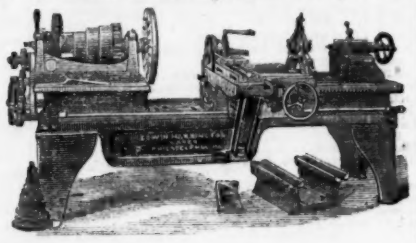

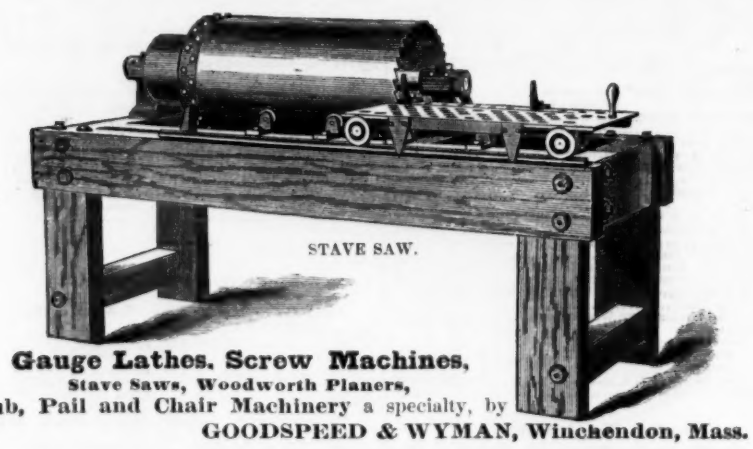

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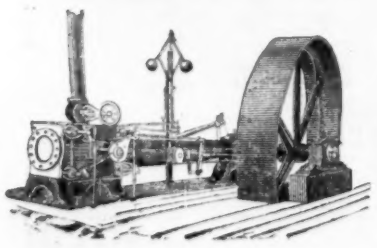

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Of all descriptions and for all purposes, of any proportion or size, for pumping Hot, Cold, Fresh, Salt, Muddy or Gritty Water, Grain-mash, Syrups, all kinds of Beer, Acids, Molasses, and all heavy and thick fluids. Also for Feeding Steam Boilers, Supplying Tanks, and for Sugar Refineries, Tanneries, Oil Refineries, Gas Works, Hotels, Breweries, and for all classes of manufactories: for Draining Mines and Excavations, and for Rolling Mills, Blast Furnaces and Water Works supplying Cities, Towns and Villages with Water; also, for Wrecking purposes and Steam Fire Engines for Land and Sea.

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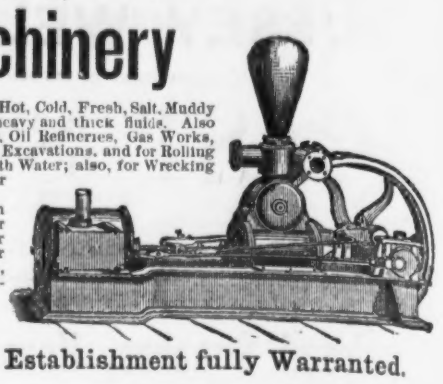

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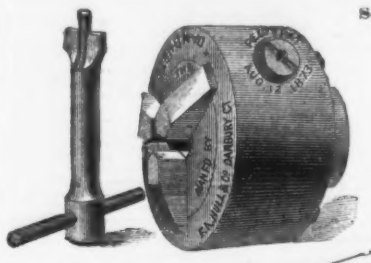

The "Danbury" Universal Drill Chuck.

Notequalled in any essential Only Chuck holding drills from ¼ down to 0. Runs *true* on all sizes, and will never slip or "set."

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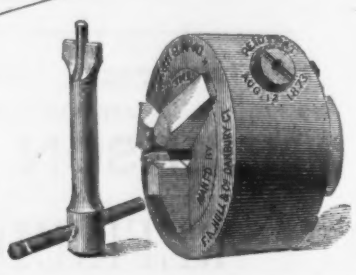
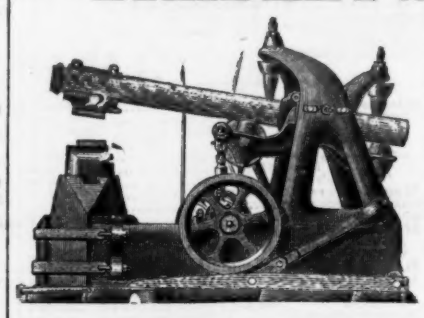


C. H. Reid's Patent, Aug. 12th, 1873.

BRADLEY'S CUSHIONED HAMMER.



This Hammer has many valuable improvements made useful in the device for cushioning the blow, thereby relieving all the working parts from that jar and concussion which is the destroying element of other Helve Hammers. It is made Adjustable in Line of Action, Length of Stroke, Rapidity of Motion, and Weight of Blow, all of which are controlled at the will of the operator. They have ***Larger Capacity, Cost Less,*** are more ***Durable,*** take up ***Less Room,*** do ***More*** and ***Better Work*** at ***Less Expense*** for Power, than any other Hammer in use. We guarantee them fully as recommended. For particulars, address

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Manufacturers of the Celebrated

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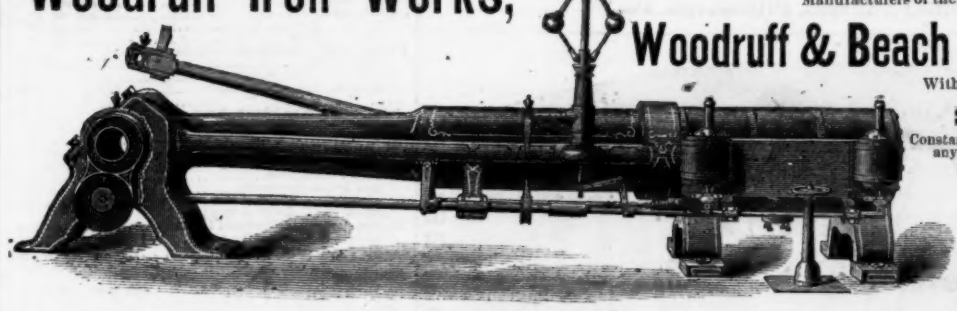
With recent valuable improvements.



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Constantly on hand and made to order of any size or style. Special attention given to the manufacture of

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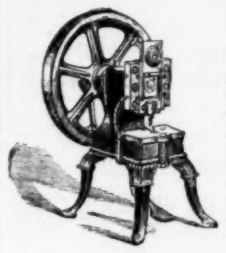
Of any size or style. Direct all letters to **The Woodruff Iron Works, Hartford, Conn.**, as the Woodruff & Beach Iron Works and firm of Woodruff & Beach are both dissolved.

Reduced Price List of The Fowler Power Press.



Number.	00	0	1	1½	2	2½	3	Tinners.	Tinners.	Tinners.	Tinners.	Boiler.
Price, with all improvements.....$	100	150	200	250	300	400	500	400	600	700	800	400
Price, without Patent Adjustment.....$	85	130	175	220	265	360	450	375	550	650	460	375
Price, without Patent Adjustment or Automatic Stop.....$	75	120	165	210	250	345	435	360	463	635	445	360
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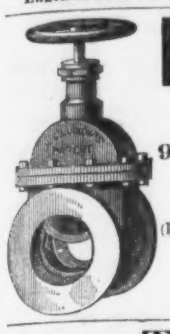

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(Double and Single Gate, ¼ in. to 48 in.—outside and inside Screws, Indicator, &c.)
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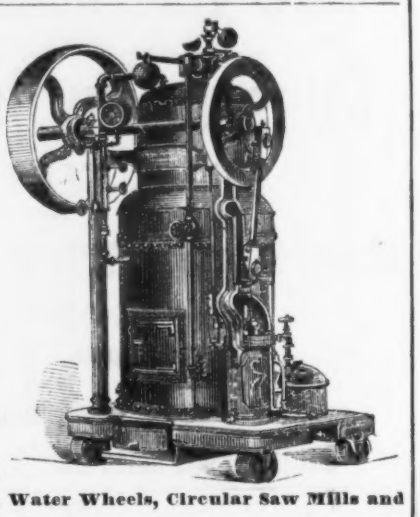
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With Patent Adjustable self-oiling Bearings.
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Send for list of Pulleys, &c.
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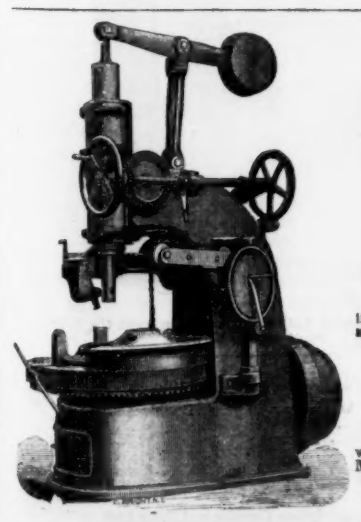

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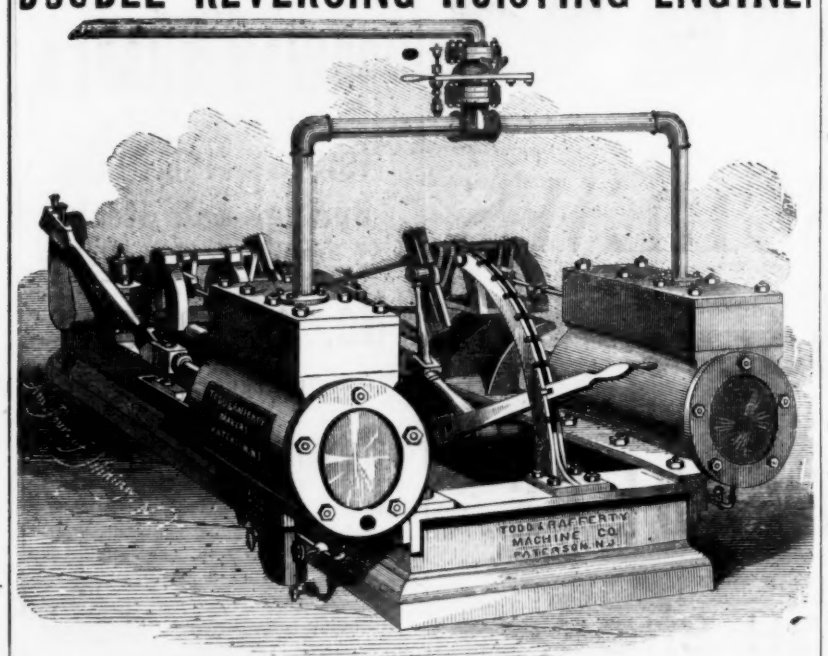

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Being worked with a rope the motion is quick and steady, and in many cases is more suitable than the chain block. It is self-sustaining, the eccentric brake being put in or out of action by moving the hand-rope to the right or left, or by pulling the rope outward. The weight can be lowered or sustained at any desired point.

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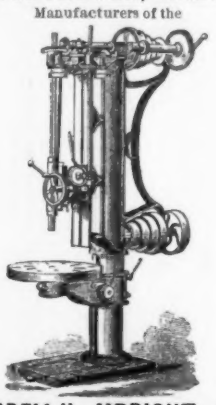

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Manufacturers of
VERTICAL STEAM
Engines & Boilers
The Safest and Best in the Market.

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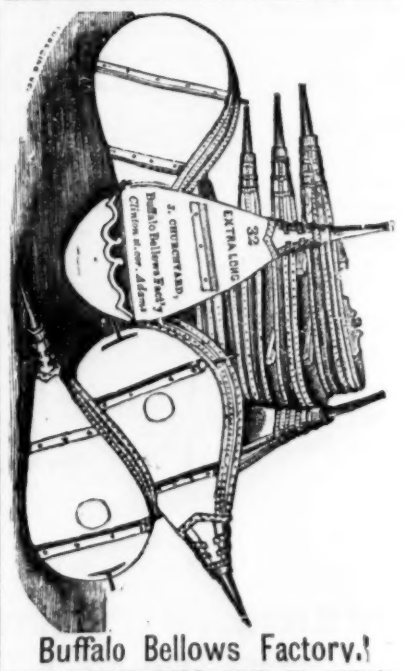

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A	" "	35 cts.	℔ lb
B	" " "	30 cts.	℔ lb
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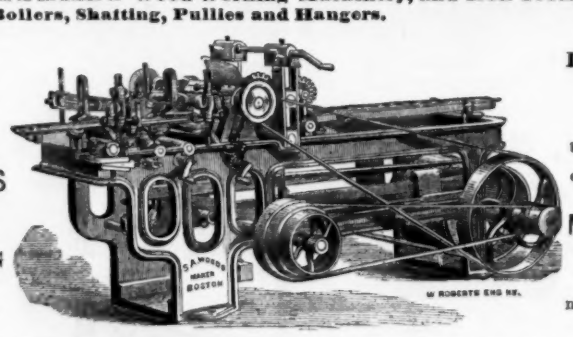

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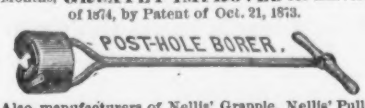

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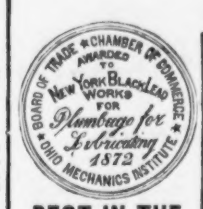
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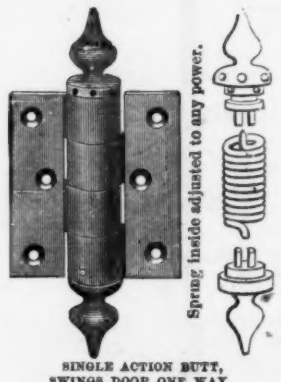

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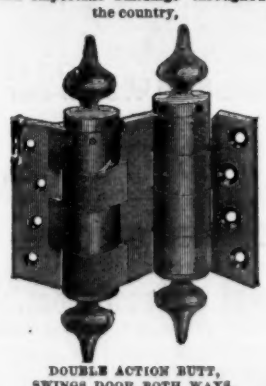

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